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THE EVALUATION OF PROTEIN HYDROLYSATES
Robert W. Wissler et al.

FOOD HABITS OF WOMEN DURING PREGNANCY
Margaret C. Moore et al.

EVALUATION OF MILK IN SCHOOL LUNCH PROGRAMS
W. H. Sebrell, F. F. Tisdall, and Icie Macy Hoobler

SOME CRITERIA FOR EVALUATING SCHOOL LUNCH PROGRAMS
Margaret B. Dreisbach

ASCORBIC ACID, CAROTENE, AND VITAMIN A CONTENT OF RESIDENCE HALL FOOD
Florence I. Scoular and June Kelsay

RETENTION OF THE B VITAMINS IN BEEF AND LAMB AFTER STEWING. V. Riboflavin
Sylvia Cover and Esther M. Dilsaver

HOSPITAL LIBRARY

PSYCHIC INCOME FOR EMPLOYEES
Helen Esray-Chase

Nutrition and Dietetics in the Medical Curriculum

Nutrition and Dietetics in Medical Practice

Educational Opportunities for the Dietitian

Advances in Public Health Nutrition

Methods of Employee Education in Sanitation

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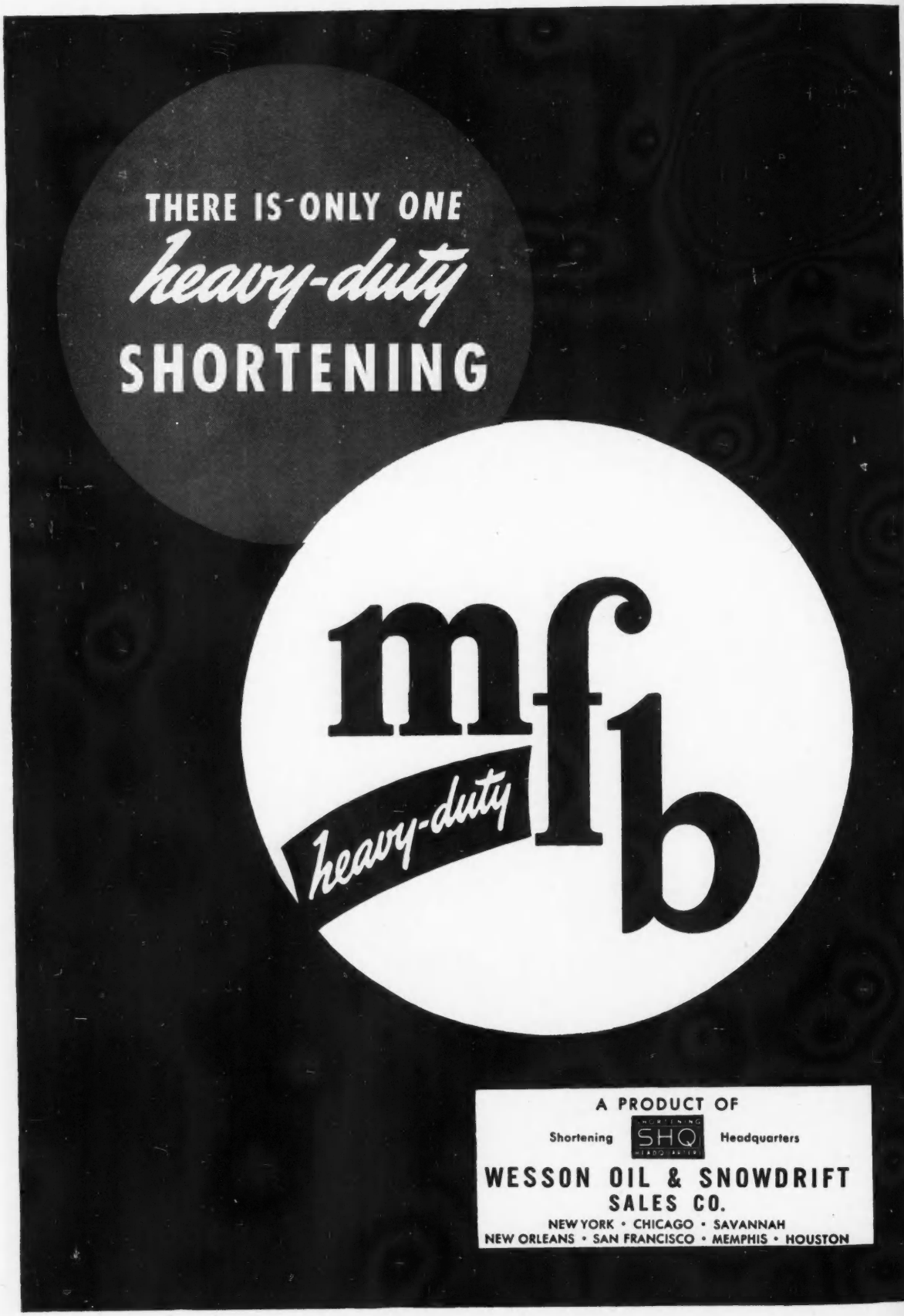
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The Evaluation of Protein Hydrolysates[1]

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DESPITE accumulating evidence of the therapeutic potentialities of protein hydrolysates (1), relatively little study has been made of their comparative effectiveness in the synthesis of various kinds of tissue protein. For many types of tissue proteins, however, an adequate supply of all of the essential amino acids is required. A protein hydrolysate, therefore, no matter how employed, should (a) be derived from high quality protein and (b) be prepared with a minimum of damage to any of its essential amino acids. Hydrolysates prepared otherwise may be nutritionally inadequate or even harmful.

In the evaluation of protein hydrolysates it is customary to determine their capacity to establish nitrogen equilibrium or to engender the production of plasma protein. Although these determinations may furnish valuable information, hydrolysates should be evaluated in terms of overall synthesis of tissue protein. For example, the mere attainment of positive nitrogen balance in the ill or convalescent patient who is severely protein depleted is not the goal of nutritional therapy. Rather, the objective should be to establish the highest possible level of physiologic nitrogen retention and thus insure speedy repletion of depleted protein reservoirs. Similarly, the fabrication of limited quantities of plasma proteins while the patient is losing weight and hemoglobin does not indicate adequate protein nutrition for the subject as a whole. Instead, the ideal protein hydrolysate would be one which most efficiently promotes maximal protein fabrication in all of the vital protein compartments of the body when fed or administered to the protein-deficient patient in practical quantities.

Unfortunately, no minimal standards have as yet been established for the evaluation of protein hydrolysates. At present chemical and microbiological methods can be used to determine the amino acid composition of an hydrolysate. These methods, however, still require further development and standardization before they will be easily applicable to all amino acids and before consistent agreement from laboratory to laboratory can be obtained. Moreover, some of the chemical methods may fail to reveal amino acid injuries which may occur during the preparation of an hydrolysate (2, 3).

Even after the amino acid composition of an hydrolysate is known, the question still remains: what are the daily optimal requirements for each essential amino acid for man, in health and in disease? Rose and his associates are now determining the essential amino acid requirements for nitrogen balance in healthy young men (4). The human requirements for maximal tissue synthesis in various stages of protein depletion, however, are completely unknown, and these may be several-fold those necessary for maintenance alone. For the present, therefore, evaluation of the nutritive potentialities of protein hydrolysates must depend largely upon biologic assay in experimental animals. The present paper describes the results of such assays in protein-depleted adult male albino rats, utilizing our "rat-repletion" method (5, 6).

The protein-depleted rat is well suited for this type of assay for the following reasons:

(a) Its qualitative essential amino acid requirements parallel closely those for man (7, 8).

(b) Such animals simulate conditions of protein depletion seen in many sick patients.

(c) The small size of the rat and its ready consumption of synthetic rations make the assay relatively simple and inexpensive.

(d) Protein depletion provides an increased stimulus for the fabrication of tissue and blood proteins. Consequently, in a relatively short experimental pe-

[1] The subject matter of this paper has been undertaken in cooperation with the Committee on Food Research of the Quartermaster Food and Container Institute of the Armed Forces. The opinions or conclusions contained in this report are those of the authors. They are not to be construed as necessarily reflecting the views or indorsement of the War Department.

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riod one can measure much larger increases in protein than those found in physiologic growth.

(e) It is possible to measure refilling of several protein compartments simultaneously.

The method is similar in principle to those commonly used for the bioassay of vitamins and hormones in animals which have been made deficient in these substances. When only a simple screening test for determinig the nutritive potentialities of an hydrolysate is desired, only the weight recovery is measured during a repletion period of fourteen days in which the rats are fed a standard low-protein ration supplemented with the test hydrolysate. For a more complete evaluation, hemolysin production and the repletion of plasma protein, hemoglobin, liver protein, and carcass protein are measured simultaneously. By this means it is possible to ascertain the overall effectiveness of the hydrolysate in satisfying multiple protein needs.

METHODS AND MATERIALS

The general principle of the method of rat depletion has been described elsewhere (5, 6). With slight alterations, this method was used in the present study for the assay of protein hydrolysates. In brief, it consisted of the production of protein deficiency in young adult male albino rats (Sprague-Dawley strain) weighing from 200 to 230 gm. This was accomplished by feeding a low-protein ration (3E) for from two to three months[2] until there was a weight loss of approximately 30 per cent. Simultaneously, the concentration of serum proteins fell to between 4 and 5 gm. per 100 cc. and that of hemoglobin to between 10 and 13 gm. per 100 cc. During this depletion period, the animals were kept in large wire-bottomed cages, six to eight to a cage. When the desired degree of depletion was obtained, the animals were weighed and blood samples taken. Then, on the basis of original weights, weight losses, and concentrations of serum protein and hemoglobin, they were divided into comparable groups. Grossly abnormal animals were excluded.

Test rations, in which the hydrolysates had been incorporated were then fed to the rats for a fourteen-day period. During this time the quantity of diet consumed was measured each day, and the animals weighed at specific intervals. The experiment was completed on the fourteenth day at which time the animals were weighed, blood samples taken, and sacrificed.

Three groups of rats were used for control purposes. One group was always fed an equal mixture of lactalbumin and casein[3] as a standard of reference for comparison with the hydrolysate. This was added to the basal ration (3E) at a nitrogen concentration of 1.44 per cent. A second type of control group was maintained to serve as a negative control in relation to liver analysis, carcass analysis, and antibody production. These were protein-depleted animals which were fed only a low-protein basal ration (4E) for the fourteen-day period. In addition, a group of normal animals of comparable age were usually maintained throughout the depletion and repletion periods on a 22 per cent casein ration which was otherwise equivalent to the experimental rations.

Hydrolysates. The hydrolysates tested fell into two groups: (a) those in process of development by various manufacturers and supplied to this laboratory for a simple screening test, and (b) two hydrolysates purchased at the University of Chicago Clinics Pharmacy. These will be referred to as Hydrolysates A and B.

Hydrolysate A was bottled in sterile liquid form consisting of 5 per cent hydrolysate and 5 per cent dextrose and contained 0.66 per cent nitrogen. It was prepared from casein by enzymatic hydrolysis with pork pancreas.

Hydrolysate B was purchased in powder form and contained 7.26 per cent nitrogen. It consisted of amino acids and polypeptides derived from milk, beef, wheat, and yeast. According to the label, carbohydrate made up 43.3 per cent of the dry weight.

Rations. For the repletion period the test rats were placed in individual wire-bottomed cages and were fed a low-protein basal ration (4E) to which the various hydrolysates had been added at a nitrogen level of 1.44 per cent. To make the test ration equal in calories and roughage, corrections were made to allow for suitable quantities of carbohydrate, fat, and roughage. Rations were fed to each rat in 15-gm. portions which contained 48 calories.

Proximate analyses were made of all of the hydrolysates. The results were used in calculating the quantity of hydrolysate necessary to obtain a 1.44 per cent concentration of nitrogen (216 mg. of test nitrogen being offered daily) in the test ration.

Hydrolysate A was not incorporated in the basal ration; instead, it was fed in fluid form from a regular water bottle. Thirty-three gm. per rat per day were offered which were equivalent in test nitrogen to that in the other test rations. In addition, each of these rats was offered 12 gm. of a low-nitrogen basal ration modified so that the combined daily food supply from the liquid hydrolysate and the basal diet was equivalent in all constituents to that furnished by 15 gm. of the ration fed to the other animals. The rats drank Hydrolysate A readily and after the first few days of the experiment consumed nearly all of the modified basal ration. Thus, their nitrogen intake was equivalent to that of the controls on the lactalbumin-casein mixture, although their caloric intake was approximately 10 per cent less.

[2] In more recent experiments, it has been found that the depletion period can be shortened to about one month by employing a basal ration, 4E, which is practically devoid of protein.

[3] Borden's Lactalbumin No. 1542 and Smaco "Vitamin-test" casein.

Other methods. The methods of taking blood samples and determining serum protein concentration, hemoglobin concentration (5), blood and plasma volumes (9), and hemolysin titers (10) have been described. The methods employed in the liver and carcass analyses will be described elsewhere (11–12).

RESULTS

The results of assays of twenty-five hydrolysates are presented in Table 1. In most instances the exact composition of the hydrolysates and the details of the methods of hydrolysis were not known to the investigators. The results were intended to give the manufacturers information as to the nutritive potentiality of a given product, rather than a comparative appraisal of the hydrolysate. The tabulated data are of interest, however, because of the marked variations in weight response. For example, although the first six samples were all casein hydrolysates, those prepared by acid hydrolysis (Nos. 1 and 2) failed to induce weight gains.

Casein hydrolysates. Supplementation of an acid hydrolysate of casein by tryptophane (No. 4) or submitting it to only slight acid treatment (No. 3) resulted in a more effective product, although still inferior to an enzymatic hydrolysate of casein (No. 5). The weight recovery produced by this enzymatic hydrolysate was similar to that which has been obtained in this laboratory in comparable experiments with casein itself. That casein can be improved by proper amino acid supplementation was demonstrated by hydrolysate No. 6, in which the addition of methionine increased the extent of weight recovery.

Lactalbumin hydrolysates. A similar variation was evident in the hydrolysates of bovine lactalbumin (Nos. 7–9). Again, this variation apparently depends upon the method of hydrolysis. Of the pro-

TABLE 1

Weight gains of protein-depleted rats fed protein hydrolysates for fourteen days

SAMPLE NO.	STARTING MATERIALS AND SUPPLEMENTATION	METHOD OF HYDROLYSIS	NO. OF RATS PER GROUP	AVERAGE NITROGEN CONSUMED PER RAT	AVERAGE WEIGHT GAIN OR LOSS PER RAT	AVERAGE NITROGEN EFFICIENCY*	COMPARISON WITH CONTROL PERFORMANCE**
				gm.	*gm.*		%
1	Casein	acid	3	2.06	−2	<0	<0
2	Casein	acid	2	1.68	−12	<0	<0
3	Casein	slight acid	5	3.33	+35	10.5	51
4	Casein + tryptophane	acid	3	3.41	+36	10.6	51
5	Casein	enzyme	5	3.15	+54	17.1	83
6	Casein + methionine	enzyme	5	3.69	+70	19.0	92
7	Lactalbumin	acid	2	1.63	−12	<0	<0
8	Lactalbumin	acid + enzyme	8	2.70	+43	15.9	77
9	Lactalbumin	enzyme	6	3.21	+59	18.4	89
10	Beef fibrin	acid	3	3.17	+53	16.7	81
11	Beef fibrin + casein	acid	3	2.45	+21	8.6	42
12	Beef plasma	enzyme	4	2.99	+49	16.4	79
13	Beef plasma	enzyme	3	3.07	+62	20.2	98
14	Mixed liver	enzyme	8	3.21	+57	17.8	86
15	Fish meal	acid	4	2.34	−7	<0	<0
16	Soy grits + 10 per cent blood	enzyme	7	2.90	+23	7.9	38
17	Soy grits + 10 per cent wheat germ	enzyme	8	3.06	+23	7.5	36
18	Soy + yeast	enzyme	4	2.83	+41	14.5	70
19	Corn stillage	enzyme	4	2.88	+36	12.5	60
20	Soy meal	enzyme	5	3.17	+37	11.7	57
21	Sunflower seed meal	enzyme	6	3.17	+36	11.4	55
22	Wheat germ meal	enzyme	6	2.49	+7	2.8	14
23	Yeast + 2 per cent cystine, 1 per cent methionine	enzyme	7	3.18	+50	15.7	76
24	Yeast + 2 per cent cystine	enzyme	7	3.09	+46	14.9	72
25	Yeast + 1 per cent cystine	enzyme	10	3.09	+46	14.9	72
Control†	lactalbumin-casein, 1:1	whole protein	30	3.24	+67	20.7	—

* Expressed as grams of weight gained per gram of nitrogen consumed.

** Expressed as 100 times the ratio of the "average grams gained per gram of nitrogen consumed" for each hydrolysate to the similarly derived figure (20.7) for the lactalbumin-casein group.

† Averaged data of five groups of rats from five experiments. The rats were comparable in each experiment with the animals used for testing the above hydrolysates.

teins tested, lactalbumin produced one of the best weight recovery scores. However, none of the hydrolysates of this protein was as effective as lactalbumin itself.

Other hydrolysates of animal protein. Of the other animal protein hydrolysates tested (No. 10–15), enzyme-hydrolyzed beef plasma (No. 13) has showed particular promise, and mixed liver (No. 14) and beef fibrin (No. 10) also gave moderately good scores.

Vegetable protein hydrolysates. Several vegetable protein hydrolysates, some supplemented with other proteins or amino acids, were tested. The best of these was a yeast product which was supplemented with methionine and cystine (No. 24). However, only one of the ten vegetable hydrolysates tested exceeded the 75 per cent mark of effectiveness as measured by weight recovery in comparison with the standard reference protein. In contrast, eight of the sixteen hydrolysates derived from animal protein exceeded this figure.

Inspection of the figures for nitrogen consumption in Table 1 reveals a marked variation during the two-week period, despite the fact that each ration had an essentially identical nitrogen content and that each animal was offered an equal quantity of ration per day. In other words, some groups of rats refused to eat their entire ration. In previous experiments, the authors have shown that appetite declines rapidly when the protein-depleted animal is offered a ration deficient in any one of nine indispensable amino acids (excluding arginine). Conversely, food consumption can be promptly restored by inclusion in the ration of a few milligrams of the missing amino acid (13). These observations indicate that, in an otherwise adequate ration, the rat's appetite is influenced by the completeness and balance of the amino acid mixture in the ration. Under these conditions, therefore, consumption figures may give almost as good an indication of the adequacy of the essential amino acid composition of a diet as do weight changes.

Table 2 summarizes the comparative results obtained when Hydrolysates A and B were offered in equal quantities of nitrogen per day. Here it can be seen that the rats receiving the ration containing Hydrolysate B (Group 2) barely maintained their weight in the two-week period, whereas those receiving Hydrolysate A (Group 1), gained an average of 51 gm. In other words, Hydrolysate B, when tested by the same procedure used for the hydrolysates tabulated in Table 1, failed to induce weight gain in protein-depleted rats. This hydrolysate, however, produced some slight benefit to the animals as shown by the fact that comparable rats which were continued on the low-protein basal ration 4E (Group 6) for the two-week period lost an additional 18 gm.

The poor weight response of the animals eating Hydrolysate B cannot be accounted for entirely by their diminished food consumption. This was demonstrated by the results with another group of rats (Group 3) receiving Hydrolysate A at a slightly lower level than that voluntarily chosen by the rats eating Hydrolysate B. These animals gained an average of 18 gm. per rat despite the dietary restriction. Furthermore, the amino acid deficit of Hydrolysate B was apparently so great that even doubling the quantity of this hydrolysate per unit of ration (Group 4) resulted in only a 21-gm. average weight gain in a two-week period. This was less than half the gain shown by the rats receiving Hydrolysate A (Group 1), even though the latter animals received only 66 per cent as much dietary nitrogen during an equal period.

The possibility that Hydrolysate A might be further improved is suggested by the superior weight response of the animals receiving the lactalbumin-casein mixture at an approximately equivalent nitro-

TABLE 2

Average weight changes in relation to diet consumption of protein-depleted rats fed two hydrolysates for fourteen days

GROUP	RATIONS	NO. OF RATS	DIET CONSUMPTION				WEIGHT GAIN OR LOSS		NITROGEN EFFICIENCY*	
			Nitrogen		Calories		Average	Standard error	Average	Standard error
			Average	Standard error	Average	Standard error				
			gm.		*gm.*		*gm.*			
1	Hydrolysate A	10	3.21	±0.007	647	±4.2	51	±1.3	15.8	±0.42
2	Hydrolysate B	10	2.22	±0.053	447	±10.7	−1	±1.6	—	—
3**	Hydrolysate A	10	2.04	±0.005	393	±3.0	18	±1.2	8.8	±0.60
4	Hydrolysate B†	10	4.92	±0.133	484	±13.1	21	±2.1	4.3	±0.36
5	Lactalbumin-casein	10	3.37	±0.050	655	±2.9	70	±2.8	20.7	±0.47
6	4E basal	10	0.18	±0.004	375	±6.3	−18	±3.1	—	—

* Expressed as grams of weight gained per gram of nitrogen consumed.

** The rats in this group were offered a restricted amount of diet to establish nitrogen and caloric intakes slightly lower than those of Group 2.

† The concentration of the hydrolysate in this ration was increased so that the rats of this group were offered double the quantity of test nitrogen offered to Groups 1 and 2.

gen level (Group 5). The results of supplementing a casein hydrolysate with methionine (Table 1) suggest that this may be a limiting amino acid in the nutritive potency of Hydrolysate A. However, in view of the recent evidence that the greater need for methionine and cystine in lower animals may be due to the fact that larger amounts of cystine are required for the growth of hair, supplementation of casein hydrolysates with methionine for use in humans may be superfluous (14). Evidently man's requirements for methionine may be satisfied by casein alone, provided adequate quantities of casein are ingested or administered.

In order to ascertain the relationship between these weight changes and the amount of nitrogen actually retained by the animal, carcasses of representative animals which had been fed the four types of diet were analyzed. Thus, the animal eating the low-protein basal ration (4E) contained 21.0 gm. of carcass protein whereas the animal fed the Hydrolysate B ration contained 20.7 gm. In contrast, the animal consuming the lactalbumin-casein ration (Group 5) contained 31.0 gm. of carcass protein, and the rat eating the Hydrolysate A ration contained 30.5 gm. The remainder of this greater weight gain can be accounted for by the presence of more water and fat in the carcasses.

Blood protein gains or losses of four representative animals of three of the groups fed Hydrolysates A and B were measured. The results are summarized in Table 3, where it can be seen that Hydrolysate B (Group 2) had a definitely inferior potentiality to produce serum protein and led to a loss of hemoglobin

TABLE 3

Gains or losses in circulating serum protein and hemoglobin for fourteen days

GROUP*	RATIONS	NO. OF RATS	GAIN OR LOSS IN CIRCULATING PROTEIN			
			Serum Protein		Hemoglobin	
			Average	Standard error	Average	Standard error
			mg.		*mg.*	
Experimental						
1	Hydrolysate A	4	216	±28	429	±38
2	Hydrolysate B	4	95	±27	−164	±53
3	Hydrolysate A	4	166	±16	170	±75
Control						
C1	Lactalbumin-casein	23	280	±9	897	±32
C2	4E basal	21	9	±7	−149	±36

* The rats of Groups 1, 2, and 3 were selected from the identical groups in Table 2. Groups C1 and C2 were composed of protein-depleted rats comparable to those used in these experiments. They were fed the indicated rations for fourteen days and were comparable to Groups 5 and 6 in Table 2 in diet consumption and weight.

during a fourteen-day period of repletion. On the other hand, the feeding of Hydrolysate A led to production of serum protein which compared favorably with that engendered by the feeding of the standard reference protein, lactalbumin-casein. Hemoglobin production by the rats fed Hydrolysate A, however, was only approximately half that of the rats fed the lactalbumin-casein ration.

The results of liver analysis of these animals showed a similar trend in that the livers of the rats fed Hydrolysate A (Group 1) contained an average of 619 mg. of protein above the content of the livers of the animals continued on the basal ration (Group 6) whereas the livers of the rats fed Hydrolysate B (Group 2) contained only 227 mg. of additional protein. In other words, the rats fed Hydrolysate A stored about three times as much protein in their livers in the fourteen-day repletion period as did the animals fed Hydrolysate B. Furthermore, antibody production in the rats fed Hydrolysate A (Group 1), as measured by average hemolysin output on the sixth day after injection of antigen, was approximately three times as great as in the rats fed Hydrolysate B (Group 2).

DISCUSSION AND SUMMARY

The results demonstrate clearly the great variation in the quality of protein hydrolysates as measured by their capacity to induce tissue synthesis in the protein-depleted rat. Therefore, until minimal standards of nutritional quality have been established for these products, physicians or surgeons should employ only those which have been shown to be nutritionally adequate.

In general, the findings in this study indicate that hydrolysates prepared from high quality animal proteins by enzymatic hydrolysis offer the greatest promise. That one cannot rely solely upon these qualifications, however, is evident from the results obtained with Hydrolysate B. This product, according to its label, is prepared from milk, beef, wheat, and yeast (in unspecified proportions) and is reportedly hydrolyzed by enzymatic methods. Nevertheless, it has been shown to be incapable of inducing weight gain and hemoglobin production in the protein-depleted rat when fed at nitrogen levels which gave a good response when Hydrolysate A or milk proteins were fed. Moreover, Hydrolysate B appeared to be inferior in its ability to engender the formation of serum proteins, liver protein, and antibody globulin.

It is obvious from these findings that protein hydrolysates, in common with other pharmaceutical products intended for the treatment of the sick, must fulfill certain standard requirements of potency and that a standardizing procedure is needed.

For the present, our knowledge of the similarity between the amino acid requirements of man and the albino rat suggests that no hydrolysate incapable of

producing adequate weight gains in the protein-depleted rat should be used in the treatment of sick patients. For, aside from the lack of nutritive benefit, the patients are at the same time deprived of the opportunity to use a nutritively adequate material.

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Value of Hydrolysates Compared to Pure Protein

Are amino acid mixtures as effective for promoting growth as purified proteins? Recent research indicates that they are not. Certain intact proteins seem to possess a growth factor different from any of the amino acids obtained in their hydrolysates. The protein molecule either contains essential structures in addition to amino acids, or, as normally purified, has extraneous growth factors bound to it. Perhaps some of the purification procedures used in the hydrolysis of proteins change the nutritive value, thus limiting the potency of the amino acids.—*Abstracted from "A Chemist's View of Nutrition" by Leonard A. Maynard, in Science 105: 399 (April 18), 1947.*

New Findings on "Essential" Fatty Acids

At the recent annual meeting of the directors and officers of the National Live Stock and Meat Board, Dr. Robert S. Harris, Massachusetts Institute of Technology, reported a group of experiments in which the deuterium technique was used to study the metabolism of fatty acids contained in food fats, such as lard. In this technique, the fatty acid is labeled with the heavy hydrogen, fed in the diet, and the fat in the tissues of the rat is then studied to determine the distribution of fatty acids. His data indicate that:

(a) The skin plays a very important role in fat metabolism.
(b) The kidney is also intimately involved with fatty acid metabolism.
(c) Rats utilize iso-oleic acids as energy.
(d) The complete metabolism of fatty acids to carbon dioxide and water requires two days before the combustion water appears in the urine.
(e) Iso-oleic acids can be biologically hydrogenated.
(f) Under the appropriate conditions, the rat can synthesize the "essential" fatty acid, arachidonic acid.

Food Habits of Women During Pregnancy[1]

MARGARET C. MOORE[2], MAUD BOMAR PURDY[3], E. JANIS GIBBENS[4], MARTHA E. HOLLINGER[5], and GRACE GOLDSMITH[6]

IN LOUISIANA, the maternal and infant mortality rates have always been high when compared with the average for the United States (1–4). These mortality rates are known to increase as the percentage of Negroes in the population rises, but Louisiana has had higher rates than other states with a comparable Negro population (1, 5). Since it is now generally accepted that the health of both mother and child is affected by the nutrition of the mother (6–12), it was thought that an investigation of the dietary habits and nutritional status of pregnant women might throw some light on maternal and child health problems in the state.

PROCEDURE

This study was planned and carried out by the Louisiana State Department of Health in cooperation with Louisiana State University and the Tulane University School of Medicine. The State Department of Health selected for study women who were enrolled in its regular prenatal conferences, many of whom were participating in the Emergency Maternity and Infant Care Program. Private physicians were asked to cooperate[7] by selecting some of their patients so that all economic groups would be represented. Women were chosen who lived sufficiently near laboratory facilities to make the study of blood and urine samples feasible. The subjects lived in urban or rural areas of the black land part of the state, commonly known as the "sugar bowl" because sugar cane is grown extensively in this area. The criteria for selection of the subjects were as follows: natives of Louisiana or persons having lived in the state for ten years; intelligent, cooperative women who were capable of keeping a careful record of a week's dietary intake; and subjects who were willing to have a blood sample taken at the end of the dietary study, to collect urine specimens, and to allow clinical pictures to be made.

After consultation with the physician in charge of the case, each woman was visited by the research worker and the project explained in detail. A diet record was kept for a seven-day period during which time the worker made three to five visits to the subject's home. These visits assisted greatly in obtaining quantitative data concerning the food consumed. Cooking methods were investigated, and each woman was questioned regarding the habitual use of sedatives, mineral oil, or vitamin supplements. The occupation of the wage earner of the family and the approximate family income were also recorded. On the last visit, a 1-hr. fasting specimen of urine and a venous blood sample were collected. Clinical pictures of the mouth, tongue, lips, eyes, and skin were taken as soon thereafter as possible. The laboratory and clinical data will be reported in detail in subsequent papers.

The diet record of each woman was analyzed and the intake of individual nutrients calculated. The calculations were based, whenever possible, on the values given by the Bureau of Human Nutrition and Home Economics in cooperation with the National Research Council (13), supplemented by data from

[1] Part of the data in this paper were included in the theses for the degrees of Master of Science of Maud Bomar Purdy and E. Janis Gibbens. Additional diet histories were gathered by Eola P. Rooks and Annette Chube Reid, nutritionists, Louisiana State Department of Health.

Financial assistance for the work done at Louisiana State University was received from the General Education Board; for the work carried out in the Department of Medicine, Tulane University, from a grant from the Williams Waterman Fund; for the field study done under the supervision of the Louisiana State Department of Health, from funds of the State Department of Health allocated by the U. S. Public Health Service. Received for publication July 10, 1947.

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TABLE 1

Percentage of vitamin losses in certain cooked foods

FOOD	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN	ASCORBIC ACID
	%	%	%	%	%
Eggs	0	20	20	25	0
Meat, fish, fowl, etc.	0	40	20	30	100
Vegetables, green leafy	30	35	20	25	50
Vegetables, other, and fruits	5	30	15	15	50
Bread, toasted	0	25	0	0	0
Beans, dried	0	10	0	0	50
Oatmeal, rice, grits	0	0	0	0	0

the compilations of Bowes and Church (14). Corrections were made for vitamin losses in cooking (14, 15). Since food is usually overcooked in this area, the losses of vitamins shown in Table 1 were applied to the values given for raw foods. No losses were applied for mineral nutrients.

Unusual foods were of considerable importance in a few of the diets; for instance, one rural woman ate raccoon, opossum, venison, squirrel, and rabbit in the course of one week. Since analyses for some of the nutrients in these meats were not available, the values used in one of the short methods of dietary analysis (16) were substituted for the missing data.

Each woman's average daily intake of nutrients and calories was compared with the recommended dietary allowances of the Food and Nutrition Board of the National Research Council for the latter half of pregnancy (17). Any diet was rated "excellent" in a specific nutrient if the average daily intake of that nutrient was 100 per cent or more of the recommended dietary allowance; "good," if the average intake was 80 to 99 per cent of the allowance; "fair," if 60 to 79 per cent; "poor," if 50 to 59 per cent; and "very poor," if below 50 per cent. A mean dietary rating for each nutrient was then calculated by assigning the following numbers to each rating: excellent, 4; good, 3; fair, 2; poor, 1; and very poor, 0. These numbers were added together and an average obtained for each woman which was designated the mean dietary rating.

FINDINGS

Diet histories were recorded by a total of 159 women—90 white (57 per cent) and 69 Negro (43 per cent)—between December, 1944, and June, 1946. In the parishes (counties) from which the women were selected, Negroes constituted 42 per cent of the total population. The rural population of this area was 31 per cent of the estimated 1945 population. In 1945, the year in which most of the data were collected, 6862 babies were born in the parishes used in this study. Of these, 54 per cent were white and 46 per cent non-white. The subjects ranged in age from 16 to 42 years, with approximately 80 per cent under 30 years of age. All of the women except two were in the second or third trimester of pregnancy. In the white group, 55 per cent of the women were primiparas; in the Negro group, 23 per cent.

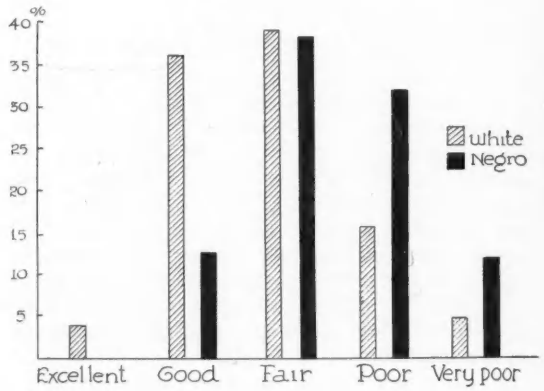

FIG. 1. *Percentage distribution of mean dietary ratings of white and Negro women during pregnancy. Diets were rated according to the recommended allowances of the National Research Council for the latter half of pregnancy.*

The percentage distribution of mean dietary ratings for the entire group is given in Figure 1. The percentage of white women with excellent and good ratings (40 per cent) was almost the same as the percentage of Negroes with poor and very poor ratings (49 per cent), while an almost equal percentage of the two groups had diets which were rated fair (39 per cent of the white subjects and 38 per cent of the Negroes). Only 13 per cent of the Negro women's diets rated good.

It is interesting that the diets of only two white women and none of the Negro women met all of the recommended allowances, while the diets of 19 per cent of the white women and 36 per cent of the Negroes met none of the recommendations.

The higher incidence of poor diets among the Negro women was not surprising in view of the low incomes and poor educational opportunities of this group. The respective role of each of these factors in the formation of dietary habits is difficult to evaluate.

The relationship of income to dietary ratings is shown in Table 2. Seven women of the entire group reported an annual income below $500; of these, the diet of the one white woman was rated good, while the diets of the Negroes were rated fair in four instances, poor in two. These seven women were in-

cluded in the income group below $750 because the number was too small to be considered separately.

None of the white women in the low income groups (below $1000) had diets which were rated poor or very poor, although approximately 20 per cent with incomes above $1500 were judged to be receiving poor diets. It seems significant that in the income brackets studied, poor diets did not disappear with increased income. Bad food habits and lack of knowledge of relative food values were deemed responsible for this. Several of the women were in income groups decidedly above $5000 per year, and their dietary ratings were not superior to women in lower income brackets, although their food included many expensive items. The percentage of good diets, however, did increase in the higher income brackets.

Findings among the Negroes were similar except in degree. There was a higher percentage of poor (or very poor) ratings in all income groups among Negroes than among whites with one exception: no very poor diets were reported by women whose family income was less than $750 per year. Any attempt to interpret these findings would be meaningless with the small number of women involved; however, it is worth noting that income at the levels included in this study does not appear to be the most important factor in determining dietary habits of Negroes. Better knowledge of food values and nutrition is needed to change the basic food habits. One fault more prevalent in the Negro than the white group was the irregularity of food consumption. Some Negroes never had a definite time for meals.

Of the 90 white women studied, 71 lived in urban communities and 19 in rural areas; of the Negro women, 25 were urban and 44 rural. (Any community with a population of 2500 or more was considered urban.) The mean rating of diets was higher among rural than among urban white women, while the reverse was true of the Negroes. No rural white women had a diet rated as excellent or very poor, but 58 per cent had diets which were considered good. Of the urban white women, 6 per cent reported diets which rated excellent; 30 per cent, good; and 7 per cent, very poor. Among rural Negroes, 5 per cent of the diets were considered good and 52 per cent poor or very poor, while among urban Negroes 26 per cent of the diets were rated good and 44 per cent poor or very poor. There were no excellent diets among the Negroes.

Since variety and quantity of food consumed is limited by availability, the local season must be considered in any dietary evaluation. In the area studied, the year may be divided as follows: November–January, February–March, April–July, and August–October. The number of women studied in each of the seasons was 32, 39, 56, and 32 respectively. During November to January when citrus fruits and winter vegetables were abundant, both the white and Negro women had their highest mean dietary ratings. In the February–March and August–October periods when the produce from local gardens was scarce, many women had lower mean dietary ratings. In the April to July season when summer produce, including cantaloupe and watermelon, was available, the incidence of good dietary ratings again increased, particularly in the white group.

TABLE 2

Percentage distribution of mean dietary ratings of white and Negro women with reference to family income

INCOME	TOTAL NUMBER	EXCELLENT	GOOD	FAIR	POOR	VERY POOR
		%	%	%	%	%
Below $750						
White	10	0	30	70	0	0
Negro	20	0	20	45	35	0
$750–$999						
White	8	13	25	62	0	0
Negro	16	0	13	31	37	19
$1000–$1499						
White	20	10	15	35	25	15
Negro	22	0	14	36	23	27
$1500–$2000						
White	17	6	17	59	12	6
Negro	6	0	0	33	33	33
Over $2000						
White	35	0	60	17	20	3
Negro	5	0	0	40	40	20

The trimester of pregnancy apparently had no influence on the dietary intake.

The average daily intake of calories for the white group was 2041 (range 815–3393); for the Negro group, 1546 calories (range 371–2606). The diets showed that 87 per cent of the white women and 96 per cent of the Negroes had average daily intakes of less than 2500 calories which is the recommendation of the National Research Council for the latter half of pregnancy. Fat and sugar were probably not consumed in the usual amounts during the period of this study because of a shortage of these commodities. All bacon and salt pork fat were calculated for calories on the raw basis for it was all used in cooking.

The type and percentage of cereals recorded in the diets appears to be characteristic of this section of the state. Wheat breads constituted 44 per cent of the total weight of breads and cereals (other than prepared breakfast cereals); rice, 33 per cent; grits and corn bread, 17 per cent; and oatmeal, 6 per cent. Since the average amount of whole grain cereals in the diet was negligible—less than ½ gm. per person daily—the value of enrichment of flour and bread is readily apparent[8].

[8] A state law requires enrichment of all white bread and flour sold in Louisiana.

The prepared cereals which were eaten did not change the picture materially. Corn flakes, bran flakes, and a few others appeared in small amounts in about one third of the diets. The Negro women ate less white bread, more corn bread, and more rice than did the white women.

The diet histories indicated that both the white women and the Negroes ate an average of 29 gm. of oranges daily. The average consumption of other citrus fruits was very small. The white women ate a greater variety of vegetables than the Negroes, but in a few items, the Negroes excelled. The average intakes of certain vegetables are shown in Table 3.

TABLE 3

Average daily intake of certain vegetables

FOOD	AVERAGE INTAKE OF WHITE WOMEN	AVERAGE INTAKE OF NEGRO WOMEN
	gm.	*gm.*
Sweet potatoes	14	33
Mustard, turnip, and collard greens	5	14
Tomatoes and tomato juice	34	10

SPECIFIC NUTRIENTS

Although a majority of the diets of the white women were superior to those of the Negroes in most respects, both groups consumed considerably less than the recommended allowances for calcium, thiamine, niacin, riboflavin, and ascorbic acid (Fig. 2). Iron, phosphorus, and protein were consumed in amounts which more nearly approached the recommendations. Although the average vitamin A consumption was greater than the recommended allowance, this figure is misleading because there were a number of women, both white and Negro, who consumed less than 50 per cent of the recommended allowance.

The average protein intake of the white women was 16 per cent below the recommended allowance, while that of the Negroes was 29 per cent below the same standard. The diets of 18 per cent of the women contained more than 85 gm. of protein, which is recommended for the latter half of pregnancy, but only four white and no Negro women consumed as much as 110 gm. and none consumed 142 gm. per day, which amounts have been suggested as desirable

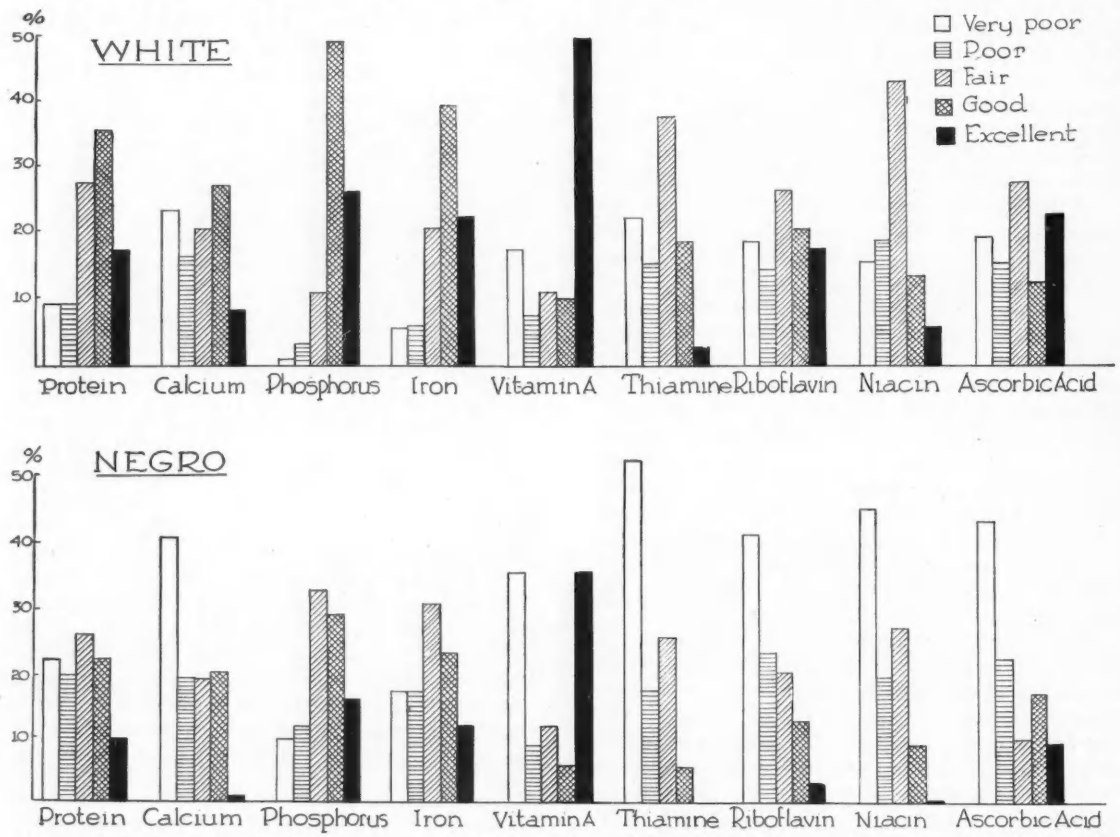

FIG. 2. *Percentages of white and Negro women with various dietary ratings with respect to intake of specific nutrients during pregnancy.*

in certain recent studies (12, 18, 19). The average protein intake of the women included in this study, 71 gm. daily, differed from that reported by Arnell who found an average of 52 gm. in a group of pregnant women in New Orleans (20).

Protein of animal origin supplied 55 per cent of the recommended allowance in the diets of white women and 45 per cent in those of Negroes. Both white and Negro women on the average ate less than four eggs a week. The white women consumed about 106 gm. of meat per day and the Negro women averaged about 90 gm. Beef and pork were the meats used most frequently. Wild game was an important item in the diet of some of the rural Negro women.

The average amounts of all kinds of milk included in the diets were: fresh milk, 453 gm. (almost 2 cups) a day for white women and 348 gm. (approximately 1½ cups) for Negroes; evaporated milk, 8 gm. per day for white women and 15 gm. for Negroes; sweetened condensed milk, less than ½ gm. daily for white women and 1 gm. for Negro women.

The low consumption of milk was reflected in the calculated calcium intake. Only 37 per cent of the diets of the white women and 21 per cent of those of the Negroes were rated good or excellent with respect to calcium. Although the diets of 51 per cent of the white women and 60 per cent of the Negroes were rated poor or very poor, the white group consumed on the average 62 per cent of the recommended allowance of calcium while the Negro group consumed only 46 per cent.

It has been suggested that the allowance for phosphorus should be at least equal to that of calcium (1.5 gm.) for the latter half of pregnancy. The white and the Negro women received 88 and 68 per cent respectively of this amount.

The quantity of iron consumed was relatively high, 87 and 70 per cent of the recommended allowance by the white and Negro women respectively. No effort was made to differentiate between the total and the available iron in these diets.

The average intake of vitamin A, including the pro-vitamin, exceeded the recommended allowances in both groups, yet 18 per cent of the white women and 36 per cent of the Negroes consumed diets containing only half the amount recommended. Vitamin A, as such, constituted 39 per cent of the reported intake of the white group and 25 per cent of the Negro, the greater part of which was supplied by milk and milk products. Pro-vitamin A was provided largely by green leafy vegetables, sweet potatoes, watermelon, and cantaloupe.

In a large percentage of cases, the diets of the white and the Negro women were found to be low in all of the vitamins of the B-complex. The intake of thiamine was rated lower than any other single nutrient in the diets of the Negroes, but the intake of riboflavin and niacin was almost as poor. The large number of very poor ratings with respect to thiamine, riboflavin, and niacin is noteworthy in view of the relatively high incidence of B-complex deficiencies reported in Louisiana (21).

The intake of ascorbic acid was low and extremely variable, as was the consumption of fruits and vegetables. In 65 per cent of the Negro and 36 per cent of the white women, the intake of ascorbic acid was rated poor or very poor. The intake of a greater variety and larger quantities of fruits and vegetables by the white women accounted largely for the differences in ascorbic acid intakes of the two races.

BIRTHS, STILLBIRTHS, AND MISCARRIAGES

Of the 159 women in this study it was possible to follow 145 after delivery—82 white women and 63 Negroes. There were no maternal deaths. Eighty-one live births were reported in the white group and sixty in the Negro, including one set of twins. Two miscarriages and two stillbirths occurred among the Negroes, only one stillbirth in the white group. There were two postnatal deaths among white infants and three among Negroes. The incidence of stillbirths and infant deaths in this group was not materially different from that reported for Louisiana in 1945.

The mean dietary ratings of the women who had miscarriages or stillbirths, or whose infants died shortly after birth, was essentially the same as the rating reported for the group as a whole.

LABORATORY DATA

Blood was collected in the early forenoon from eighty-three white and fifty-four Negro women. The hemoglobin, plasma protein, and hematocrit determinations were made by the specific gravity method of Phillips *et al.* (22). Table 4 gives the findings.

TABLE 4

Average hemoglobin, hematocrit, and plasma protein values of women according to race and trimester of pregnancy

PERIOD	NO. OF WOMEN		HEMOGLOBIN		HEMATOCRIT		PLASMA PROTEIN	
	White	Negro	White	Negro	White	Negro	White	Negro
			gm./100 cc.	*gm./100 cc.*	%	%	*gm./100 cc.*	*gm./100 cc.*
Second trimester	39	34	12.2	11.3	35.9	34.2	6.2	6.6
Third trimester	44	20	11.5	10.9	34.1	32.2	6.1	6.5

It is known that both hemoglobin and hematocrit values drop after the third or fourth month of pregnancy (23, 24), due to an increase in blood volume and that these values rise after delivery. While values for normal pregnant women are not definitely established, most workers (23, 25) consider that hemo-

globin levels of less than 10.0 gm. per 100 cc. of blood indicate true anemia. Eight per cent of the white women and 17 per cent of the Negro women had hemoglobin values below 10.0 gm. The average values for hemoglobin decreased in the third trimester of pregnancy as compared with the second.

The hematocrit determinations (packed cell volume) were lower than those reported by Bethell (25) who found an average of 38 volumes per cent for normal pregnancy.

Mean levels of plasma protein were, as anticipated, lower than the average normal for the non-pregnant state. In 27 per cent of the white and 13 per cent of the Negro women, the plasma protein was less than 6.0 gm. per 100 cc.

There was no apparent relationship between the dietary intake of iron and the hemoglobin and the hematocrit values, and none between the levels of plasma protein and the dietary intake of protein.

A study of the plasma ascorbic acid of these women revealed average levels of .46 mg. per 100 cc. for white women and .31 mg. for Negroes. Fifty-five per cent of the white subjects and 75 per cent of the Negroes had values below .40 mg. per 100 cc. Only 26 per cent of the white women and 12 per cent of the Negroes had values of .60 mg. per cent or above, ordinarily considered "normal." There was little difference in average values obtained in either group with reference to trimester. Statistical analysis of the data was made to find the correlation between intake of ascorbic acid and plasma levels. For the white women, the correlation coefficient was .53 and for Negroes .33. The former is significant at the 1 per cent and the latter at the 5 per cent level.

TABLE 5

Average values for urinary excretion of thiamine, riboflavin, and N¹-methylnicotinamide according to race and trimester of pregnancy

PERIOD	NO. OF WOMEN		THIAMINE		RIBOFLAVIN		N¹-METHYLNICOTINAMIDE	
	White	Negro	White	Negro	White	Negro	White	Negro
			mcg./hr.	*mcg./hr.*	*mcg./hr.*	*mcg./hr.*	*mcg./hr.*	*mcg./hr.*
Second trimester	33	24	8.7	6.6	35.6	30.3	366.0	339.7
Third trimester	37	15	7.3	5.3	44.7	30.8	543.0	440.7

One-hr. urine samples were collected during fasting from seventy white women and thirty-nine Negro women. The results of analyses for thiamine (26), riboflavin (27), and N¹-methylnicotinamide (28) are reported in Table 5. The mean excretion of each of the three B vitamins was lower for the Negroes than for the white women. The range of values found in both groups was great. The excretion of thiamine was lower in the third than in the second trimester of pregnancy, while the reverse was true of riboflavin and N¹-methylnicotinamide. A comparison of the calculated dietary intake of each of the B vitamins and of the quantity excreted in the 1-hr. specimen of urine showed no correlation.

SUMMARY

(1) Seven-day diet records obtained from ninety white and sixty-nine Negro women who were pregnant indicated that only 4 per cent of the white and none of the Negro group met or exceeded the recommended allowances for nutrients of the National Research Council for the latter half of pregnancy.

(2) The diets of the white women improved somewhat as the family income rose, but very poor diets did not disappear in the upper income groups. The diets of the Negro women were poorer than the white in all income groups.

(3) Rural white women had more good diets than did urban white women, but the reverse was true for the Negroes.

(4) There was a peak of higher dietary ratings that seemed to coincide with late fall gardens and the local citrus crop, followed by a period of poorer intake when local produce was not available and when few people had gardens. Another improvement in diet occurred in the white group during the spring and early summer.

(5) The average caloric value of the diets of both white and Negro women was low. This may have been due to the acute shortage of fat and sugar.

(6) The average protein intake was fairly good, when 85 gm. was considered as the point of reference. Animal protein constituted approximately half of the total amount consumed.

(7) The average intake of vitamin A exceeded the National Research Council's recommendation, but 18 per cent of the white women and 36 per cent of the Negroes received less than 50 per cent of this amount.

(8) The average amount of calcium, thiamine, niacin, riboflavin, and ascorbic acid in the diets was considerably below the recommendations.

(9) The incidence of stillbirths and infant deaths was not significantly different from that reported for Louisiana in 1945.

(10) Laboratory findings including hemoglobin, hematocrit, plasma protein, and urinary excretion of thiamine, riboflavin, and N¹-methylnicotinamide showed no apparent correlation with dietary intake. There was a significant relationship between the dietary intake of ascorbic acid and the plasma level.

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Diet Therapy Circa 1662

Nicholas Culpepper, "Gent. and Student in Physick and Astrology," was not actually a doctor, but didn't let this fact prevent him from practicing medicine and writing numerous books on his treatments and remedies. As Kipling said, "Nicholas could write even if he couldn't cure for nuts. . . ." Nicholas, according to his own acounts, *could* cure and did it miraculously. An example of this is to be found in his *Experimental Physick or Seven Hundred Famous and Rare Cures*, written in collaboration with Abdiah Cole, Doctor of Physick, and published in London in 1662.

CURE OF THE PHRENSIE

"Erasmus Scheminger a Citizen of Lauginga being a Ropemaker and keeping a Victualling House at the signe of the white Horse, was taken horribly and dangerously Phrantick; whom by the assistance of God the supream Physitian, I suddainly cured with these few things following.

An Epithem

"Take Rose-water six ounces, Violet water three ounces, Opium two scruples: dissolve the Opium and mingle them together. I put some drops of this liquor into his Nostrils, and I laid a thrice double cloath wet therein luke-warm to his Forehead and Temples divers times; whereupon, he grew in a short time quiet, fell asleep, slept all night, and awoke in his right wits, and was perfectly cured without any other Physick.

Diet

'Howbeit I caused him to keep a cooling, moistening and thin Diet in every respect."

—*From Army Medical Library News, Vol.* II, *No. 10 (August 1947)*

Evaluation of Milk in School Lunch Programs[1]

W. H. SEBRELL[2], F. F. TISDALL[3], and ICIE MACY HOOBLER[4]

THE introduction of milk supplementation into school lunch programs offers a special opportunity for the study of benefits accruing therefrom. This is particularly true in the various states where, because of fluid milk scarcity, nonfat milk solids have been introduced into the school lunch program by the Production and Marketing Administration of the Department of Agriculture. Such studies not only contribute to scientific knowledge but also serve for local educational demonstrations and provide evidence upon which school feeding programs can be expanded. Such evidence is needed to furnish proof of the benefits derived from an adequate school lunch, particularly in regional schools serving children of low economic background.

Studies of benefits from school lunch programs, and especially of the introduction of milk supplements where the supply is inadequate, should be encouraged. However, in order to insure that significant differences will become evident and the purposes of the studies achieved, it is considered necessary to set up certain minimum conditions under which the studies should be conducted.

The procedure outlined below is intended to describe such minimum conditions which might be expected to yield measurable benefits of milk supplementation in school feeding tests. These conditions are:

I. Adequacy of supplement

It must be recognized that unless the dietary supplement being evaluated is considerably more than 5 pt. of skim milk a week for that part of the year that the child is in school, it may be expected to be exceedingly difficult or impossible to show siginificant mprovement clearly attributable to this supplementary feeding unless severe malnutrition is present at the start of the study or unless a very detailed, elaborate, and expensive study is planned.

II. Judicious selection of study groups

(a) The whole-hearted cooperation of parents and health and school authorities is essential.

(b) A control group of the same size and composition as the study group must be subjected to the same observation. The number of children in the study and control groups should be large enough so that there will be at least 200 in each group at the end of the study.

(c) The period of observation should be a minimum of one school year, preferably longer.

(d) Children in the study and control groups must be paired as to age, sex, race, and other significant characteristics insofar as possible.

(e) Children in the study and control groups should be from the same class rooms if possible, or from the same school, or least desirably from a nearby school of similar children.

(f) The study and control groups should both be as homogeneous as possible.

(g) The groups should be selected from a stable population so that losses from the group are minimized.

(h) The medical, nutritional, and dental status of each child should be carefully evaluated at the start of the study.

(i) Existing feeding practices and facilities in the school should be surveyed at the start of the study.

III. Minimum acceptable observations

(a) Height, weight, and age. Although measurements of height and weight are

[1] Based on a report of an *ad hoc* committee of the Food and Nutrition Board of the National Research Council and approved by the Board, May 10, 1947.

[2] National Institute of Health, Bethesda, Maryland.

[3] Department of Pediatrics, University of Toronto.

[4] Children's Fund of Michigan, Detroit.

obtained by simple procedures, they must be done with care by a trained observer. Weights should not be taken on a spring balance, and the scales in use should be checked frequently for accuracy. Suitable care should be taken in the amount of clothing worn at each weighing, and shoes should always be removed. Heights should be taken either with a measuring device or against a carefully measured scale. A measurement of the standing height from the crest of the ilium to the sole of the foot is desirable. It may be desirable to plot the height, weight, and age data on such charts as the Wetzel Grid and to use other devices for obtaining additional information on comparative growth.

(b) A careful record of absenteeism and a check on the reported cause should be made. This should include a record and check of reported infections: kind, severity, and complications.

(c) A record of attendance at the school meal should be kept.

(d) Physical and dental examinations should be made at the beginning and end of the study.

(e) It is doubtful if any valid observations on mental achievement can be obtained in a limited survey. If this is attempted at all, it is essential that both study and control groups be taught by the same teachers.

(f) Adequate data on food habits and dietary histories require the services of trained personnel. On a limited survey it is better to obtain careful data by a trained worker on a sample of the groups rather than sketchy data from the entire group.

The above suggestions represent a minimum of data under restricted conditions of personnel and facilities. It is desirable to add more procedures, to carry the study for a longer period of time, and to increase the size of the groups. Procedures which would be especially desirable to add in cases of more extensive programs are:

(a) Tests of physical fitness.

(b) Adequate study of mental achievement.

(c) Careful and complete food habit and diet history records.

(d) X-ray studies.

(e) More detailed physical and dental examinations.

(f) Hemoglobin and other blood studies.

(g) More extensive anthropometric measurements.

Scientific Reasons for Enrichment of Corn

The use of niacin in the treatment of pellagra is now well known; likewise we have found tryptophane and niacin to have comparable effects. The ideal situation would be to have a diet containing high quality protein with ample tryptophane and adequate amounts of niacin. Under these conditions, tryptophane can supply the amino acid requirement and niacin the vitamin requirement. However, there seems to be no difficulty regarding the interchange of these compounds, for tryptophane may be converted to niacin, either in the tissues, in the intestinal tract, or in both places. Tryptophane may favor the total synthesis of niacin, or niacin may function in promoting more efficient utilization of tryptophane.

It is unfortunate that corn happens to be low in both niacin and tryptophane and that corn has been used in diets containing relatively low amounts of protein. It is, however, important to emphasize that other diets besides those high in corn can produce a niacin deficiency. For example, a diet containing wheat gluten gives the same growth depression as the corn ration, and the retarded growth is counteracted by either tryptophane or niacin. We are dealing, therefore, with an amino acid imbalance rather than with any specific effect from corn.

The enrichment of corn grits with niacin is based on sound scientific information. You may ask, why use niacin rather than tryptophane. The answer is clear. It would cost four hundred times as much to use tryptophane as to use niacin. Fifty times as much tryptophane is needed as niacin, and the cost of tryptophane is eight times that of niacin. The present level of niacin enrichment is adequate to compensate for the low niacin and tryptophane content of the diet when 25 per cent of the ration is composed of enriched grits. This does not mean that other attempts should not be made to improve the diet, such as perhaps making use of the corn germ, increasing the use of milk, meat, eggs, and other foods, but the price differential is, of course, obvious. I do wish to add that milk may have an additional effect beyond its protein content since we have found that milk stimulates the synthesis of niacin in the intestinal tract.—*Abstracted from an address by C. A. Elvehjem, head, Department of Biochemistry, University of Wisconsin, at a Conference on Corn Enrichment held July 14–15, 1947, at Clemson Agricultural College, Clemson, South Carolina.*

Some Criteria for Evaluating School Lunch Programs[1]

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THIS PAPER presents the results of observations made on nine selected schools for the purpose of ascertaining some characteristics of management associated with a continuing school lunch program in rural consolidated districts.

Much is known of successful school lunch programs in city school systems and of ingenious plans by which teachers in one-room schools have managed to prepare and serve lunches at school. Less is known of the many school lunch programs in large, consolidated schools located in rural communities and towns (towns under 2500 population being classed as rural). Buildings which house this type of school are generally large and modern. Elementary and high school children attend from homes in the immediate community and from the surrounding country. The number of such schools is increasing as a result of the consolidation of school districts made possible by the school bus system for transportation of pupils.

Seven consolidated type schools with school lunch programs as well as two elementary schools in fairly large towns were included in the study reported here.

Many of the data were collected by observing the preparation and service of the meal. The remainder were obtained by reference to records on hand and by interview. Two days were spent in each school, although only the first day's operation of the program was recorded. Floor plans of kitchens, dining rooms, and storage areas were drawn to show the layout of space and equipment. An inventory of food supplies on hand was taken. By the close of the second day, a complete record had been obtained showing the organization of the program; the type of management and duties of the manager; the requirements for workers; management practices in relation to purchasing, storing, preparing, and serving foods; methods of sanitation; the "complete" meal and other foods served and their acceptance by pupils; meal costs; and the type, amount, and cost of labor. The cost of operations during the previous year, total expenditures for major kitchen equipment, and, wherever available, lunchroom construction costs were also obtained.

[1] Received for publication April 11, 1947.

PUPIL PARTICIPATION

The number of enrolled children participating in the school lunch program was ascertained and the percentage of those eating a "complete" meal was determined (Table 1). A "complete" meal is the term frequently used to denote one which includes a protein food, vegetable and/or fruit, bread, table fat, and milk. Such a meal was served by all schools, although five schools offered an alternate or additional choice of other miscellaneous foods. Children who did not chooes the complete meal usually selected soup or sandwiches and a dessert, frequently ice cream. These lunches often lacked vegetables and fruits and, in many cases, milk.

In eight schools the food was served from a counter where each child in the serving line received his plate of food and picked up his ½-pt. bottle of milk. Under these circumstances, although milk was included in the price of the complete meal, the number of children who refused to take it ranged from 2 to 44 per cent. One reason for this refusal may have been the difficulty of handling it in addition to the plate of food. In one elementary school where the bottles of milk were placed at each child's plate at the tables, all children drank their milk.

In this study, the acceptability of foods was judged by the amount of plate waste. Each different food left on the plates was collected and weighed separately. As a whole, waste was not excessive, ranging from an average per person of 0.1 oz. in the school with the smallest amount to 1.1 oz. in the school with the highest plate waste. The kinds of food left in any appreciable quantity were vegetable soup, roast lamb, chow mein, and meat loaf made with canned beef. The cause for most of the plate waste seemed to be the children's dislike for the food, since the size

of the portions served was not excessive. Serving a variety of different foods from which pupils could choose did not prevent waste, as the school offering the widest choice had the highest plate waste. The school which had the lowest waste gave a choice between two green vegetables on the complete lunch. Extensive nutrition programs had been carried on in the two schools with the least waste. This no doubt influenced the number of "clean" plates.

NUTRIENT VALUE OF THE MEALS

Calculations were made of the nutrients furnished by the planned meals which were "complete" in all except one school. These values were compared with the allowances recommended by the National Research Council (1) for a child ten to twelve years of age except calories for which allowances for the seven to nine and ten to twelve age groups were averaged (Tables 2 and 3).

The lunches afforded less than one third of the day's allowance for energy value in four schools. Six failed to meet one third of the recommendation for calcium, while five did not provide that amount of thiamine. One third of the ascorbic acid recommendation was provided by only one of the schools. In minerals and vitamin A, four to six schools showed a deficit when nutrients in the lunches were compared with one third of the recommendations. Only one school, however, provided less than one third of the day's allowance for protein. All schools furnished more than one third of the day's allowance for riboflavin for those children who accepted milk. All schools except one sold ice cream in addition to the planned meal, and a few schools provided a second slice of bread to children who returned to the serving counter to request it. Such extra foods were not included in the calculations, however.

COST OF MEALS

The major cost items were food and labor. Overhead expenses were minor items, since lunchroom space was provided by the school board at no rental expense to the program. In most schools, fuel, lights, water, and janitor service were also furnished at no extra cost.

No school had estimated the food cost per meal. Prices paid for foods were available from invoices and delivery slips, however, so that it was possible, by checking the ingredients used in food preparation and the number served, to find portion costs and the food cost per meal for each school on the day of the study. A comparative study of costs for the planned meals with the nutrients furnished confirmed the well known fact that high meal cost does not assure high nutritional value (Fig. 1).

The labor cost per meal in the nine schools was, respectively, \$.032, \$.044, \$.045, \$.044, \$.031, \$.049, \$.059, \$.035, and \$.058. In making this computation, the cost of lunches furnished paid and unpaid workers was included in addition to the wages paid adult employees and pupil workers. No cash value was placed on the time worked by volunteers.

In making comparisons of schools, cost of labor is not a reliable criterion of efficiency in management since the range in labor costs per meal may reflect, in addition to differences in management practices, local variations in the level of wages. In towns located within commuting distance of a city, it was necessary for the school to compete with the highly paid city labor market.

AMOUNT OF LABOR REQUIRED

Estimates of the number of workers needed to operate school lunchrooms have frequently been

TABLE 1

Participation in the school lunch

SCHOOL	POPULATION OF TOWN	PUPILS ENROLLED IN SCHOOL	PUPILS TRANSPORTED BY BUS	PUPILS PARTICIPATING IN SCHOOL LUNCH	PUPILS NOT PARTICIPATING IN SCHOOL LUNCH	PUPILS SERVED FREE	PARTICIPANTS EATING "COMPLETE" MEAL WITH MILK	PARTICIPANTS EATING "COMPLETE" MEAL EXCEPT MILK	PARTICIPANTS SELECTING MISCELLANEOUS FOOD ITEMS	AVERAGE PLATE WASTE PER PUPIL PARTICIPATING
				%	%		%	%	%	*oz.*
1	933	435	240	82	18	*	56	44		.4
2	160	407	390	75	25	42	97	3		1
3	1896	765	475	51	49	20	94	6		1
4	2047	560	280	94	6	**	34		66	.6
5	938	840	714	58	42	†	††	††	††	1.1
6	6575	320		58	42		36	2	62	.3
7	9036	407	40	87	13	23	100	0	0	1.1
8	425	485	460	91††	9		84	11	5	.1
9	165	320	180	77	23	55	93	7		.3

* Six students worked for pay and lunches.

** Twenty students worked for lunches.

† Not federally reimbursed. "Plate" lunch and milk sold separately.

†† Includes nineteen students who purchased milk to drink with home-packed lunches.

TABLE 2

Menus of planned lunches served on the day of the study*

SCHOOL	MAIN DISH	VEGETABLE**	FRUIT**	BREAD	TABLE FAT	DESSERT	MILK
1	½ cup pork and navy beans	½ cup scalloped tomatoes	¼ cup sliced peaches	2 slices	2 tsp. margarine	1 sweet roll	½ pt. whole
2	3 oz. meat loaf	¾ cup mashed potatoes; ¼ cup raw vegetable salad		2 rolls, homemade	2 tsp. margarine	1 cookie†	½ pt. whole or chocolate milk
3	1 frankfurter	½ cup candied sweet potatoes; ½ cup green beans		2 rolls	2 tsp. margarine	2 cookies†	½ pt. whole or chocolate milk
4	3 oz. roast lamb	¾ cup mashed potatoes	½ cup applesauce	1 slice	2 tsp. margarine		½ pt. whole
5	3½ oz. meat loaf	1 medium browned potato; ½ cup green beans					½ pt. whole (purchased extra)
6	Omelette, 1 egg	1 medium boiled potato; ¼ cup diced carrots		1 slice with 1 tsp. jelly			½ pt. whole
7	1 cup chow mein with ½ cup rice			2 slices	2 tsp. margarine	¾ cup "fruit cocktail" jello	½ pt. whole
8	½ cup macaroni and cheese	½ cup spinach or ½ cup asparagus		1 roll	2 tsp. butter		½ pt. whole
9	½ cup beef stew (contained fresh potatoes, carrots, and canned peas over 1 biscuit)		¼ cup "fruit cocktail" salad			¼ cup chocolate pudding with cream‡	½ pt. whole

* As distinguished from free choices also available in schools 4, 5, 6, 8, and 9.

** Except for potatoes, all fruits and vegetables were canned.

† Commercially baked cookies.

‡ Prepared chocolate pudding mix.

TABLE 3

Calculated nutrients in planned meals showing percentages of recommended daily dietary allowances***

SCHOOL	ENERGY		PROTEIN		CALCIUM		IRON		VITAMIN A		THIAMINE		RIBOFLAVIN		ASCORBIC ACID	
	calories	*% recommendation*	*gm.*	*% recommendation*	*mg.*	*% recommendation*	*mg.*	*% recommendation*	*I.U.*	*% recommendation*	*mg.*	*% recommendation*	*mg.*	*% recommendation*	*mg.*	*% recommendation*
1	950	42	28	40	434	36	7	56	1871	42	0.6	48	0.7	42	20	26
2	825	37	34	48	366	30	5	44	1545	34	0.4	34	0.8	42	27	35
3	840	37	23	33	371	31	5	38	4978	111	0.4	36	0.7	38	6	7
4	780	35	30	43	349	29	4	36	687	15	0.4	38	0.8	42	7	9
5	565	25	30	42	324	27	4	37	797	18	0.3	22	0.7	38	9	11
6	575	25	19	28	345	29	3	25	6959	155	0.3	26	0.7	37	8	10
7	910	40	32	46	368	31	4	29	697	15	0.4	32	0.6	34	8	11
8	675	30	24	35	564	47	3	24	8041	179	0.3	24	0.8	44	17	23
9	625	28	27	38	418	35	3	26	1302	29	0.3	25	0.7	40	11	14

* Values from Bureau of Human Nutrition and Home Economics (7) and other sources.

** Recommended by Food and Nutrition Board (1). Allowances for children ten to twelve years of age, except for calories, for which allowances for seven to nine (2000 calories) and ten to twelve (2500 calories) age groups were averaged, resulting in 2250 calories.

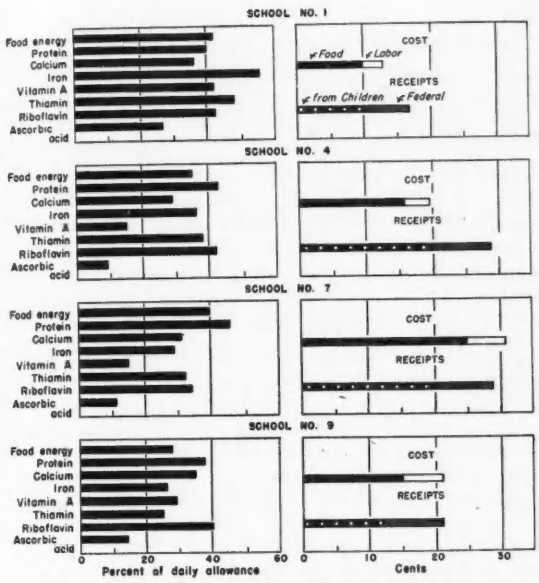

FIG. 1. *Nutritive value of meals in relation to cost.*

based on the number of meals served. In this study it was found, after totaling the hours worked by paid adults, pupils, and volunteers in the different schools, that the number of meals served per man hour ranged from five and a half to sixteen. This range may be compared to five, the number computed from information found in the Florida school lunch workshop report (2), to seven recommended by Bryan (3), and to seventeen suggested by the New Jersey State Nutrition Council (4). All estimates for these comparisons were based on the serving of approximately 300 meals.

The amount of labor needed should be determined in relation to other factors as well as to the number of meals served. For example, the size and layout of floor and work surface areas, the distance in the food preparation sequence, the number of food items served, the number of foods prepared in the school kitchen, the number of power machines available, and the number of major cleaning jobs performed by lunchroom workers all affect the labor requirement (Table 4).

With a few exceptions, the kitchen and dining room floor areas of the schools in this study (Table 4) compare favorably to space allowances suggested by West and Wood (5), Bryan (3), and the U. S. Office of Education (6). One kitchen had less floor space than the suggested allowance while a few kitchens were of maximum rather than average size.

The distance which workers traverse in the course of meal preparation depends upon the size of the lunchroom area and arrangement of equipment. In this study a measured distance which represents the sequence in which food materials move from the storeroom to the place for preliminary preparation, then to the preparation center, and finally to the serving unit has been related to the amount of labor used. This distance ranged from 26 to 107 ft., the average of all schools being 68 ft. The school showing the shortest distance had no storeroom, while the storeroom in the school showing the longest distance was located 50 ft. from the kitchen. Variations in this distance may be accounted for by location of receiving and storage areas in relation to the kitchen, size of kitchen, arrangement of equipment, and location of the preparation center in respect to the serving unit. If the layout of equipment is such that much lateral travel and regression are necessary, the labor requirement is increased. With data from a larger sample, a ratio between the distance in the food preparation sequence and the man hours of labor might be developed for use in estimating the number of workers needed.

In all schools, the cleaning of kitchen machines and equipment was the responsibility of lunchroom workers. Other cleaning jobs, including care of kitchen, dining room, and storeroom floors and dining table tops and windows, were performed by lunchroom workers or assigned to school janitors. The results indicate that a larger study would be needed to show the extent to which responsibility for major cleaning jobs affects the labor requirement.

Another factor influencing the number of workers needed for a given meal load is the number of different food items served and the kinds of dishes prepared. An analysis of the menus shows that only two schools served baked products which were made in the school kitchen. In the other schools, baker's bread or rolls and commercially baked cookies were served.

Of the eighty-seven food items served in all schools, only 45 per cent were foods requiring preliminary preparation and cooking. In making this calculation, canned vegetables and other foods that needed only heating and seasoning were not considered with the items requiring pre-preparation and cooking. Food inventories showed that most schools buy foods which need little labor in preparation and serving, such as canned fruits, fruit juices, vegetables, soups, fish, and meat. Commercially prepared salad dressing and various ready-mixed desserts, such as puddings, gingerbread mixes, and gelatine preparations, were also on hand. One school rented freezer locker space for storing farm purchased meat.

To show the effect of power machines on the labor requirement, schools were compared according to the number of pupils served per man hour of labor in proportion to the number of power machines available. Two schools with no equipment of this type served the lowest number of pupils per man hour and one with six machines served the highest number. Although this indicates that power machines reduce the amount of labor required, a larger study taking into account all factors modifying labor requirements

TABLE 4

Amount of labor related to work requirements

SCHOOL	PAID ADULTS	LABOR USED			PUPILS SERVED PER MAN HOUR*	KITCHEN FLOOR AREA PER PUPIL SERVED**	DINING FLOOR AREA PER PUPIL SEATED AT ONE TIME†	DISTANCE IN FOOD PREPARATION SEQUENCE††	NUMBER OF DIFFERENT ITEMS SERVED	NUMBER OF ITEMS PREPARED IN SCHOOL KITCHEN‡	NUMBER OF POWER MACHINES	MAJOR CLEANING JOBS DONE‡‡
		Paid adult	Pupil	Volunteer								
		hr.	*hr.*	*hr.*		*sq. ft.*	*sq. ft.*	*ft.*				
1	3	20.5	7	0	13.0	1.7	15	62	7	2	3	3
2	4	28	13	0	7.4	1.9	10	96	8	4	2	3
3	5	28	4	0	13.0	1.0	10	42	8	1	2	4
4	4	29.5	20	0	10.6	1.0	11	47	13	7	1	3
5	4	30	5	16§	9.6	1.1	11	77	14	7	4	4
6	1	8	0	25¶	5.6	1.7	9	26	14	7	0	2
7	5	35	0	30¶	5.5	1.8	16	80	4	2	0	2
8	4	28	0	0	16.0	1.2	10	74	12	5	6	1
9	4	24	4	0	9.0	0.9	11	107	7	4	4	4

* Paid adult, pupil, and volunteer labor.

** Recommended by West and Wood (5): 1.5 sq. ft. for 75 to 350 meals served or 1 sq. ft. for 350 to 500.

† Recommended by West and Wood (5): 9 sq. ft. per seat 1; by Bryan (3): 10 to 12 sq. ft. per seat.

†† The measured distance from storeroom, to preliminary preparation center, to range, to serving unit.

‡ Includes food items requiring preliminary preparation and cooking.

‡‡ Jobs include cleaning of equipment, kitchen floor, dining room floor, dining tables, storeroom, and windows.

§ Home economics students who work in lunchroom, without pay or lunches, as part of course of instruction.

¶ Volunteer mothers.

would be needed to verify this result. Some schools had more kitchen machines than were used on the day of the study. Schools without power equipment were well supplied with volunteer labor.

WORKERS' RESPONSIBILITIES

The pattern for job duties of paid adult workers was much the same in all schools, but individual schools differed in their use of volunteer and pupil labor. All schools employed a cook whose duties included responsibility for cooking and baking, serving the meat or other main dish, ordering daily supplies of perishables, checking deliveries, and supervising the storage of food. In some schools, the cook also washed the pots and pans and did some of the cleaning. Kitchen helpers assisted the cook with preparation of vegetables and salads and served cold foods and vegetables. Usually one worker assisted the cook at the serving counter and two washed dishes.

Pupils were employed in six of the nine schools to help with such work as serving food at the counter, scraping soiled dishes, assisting with dishwashing, and performing light cleaning jobs. Some received only lunches in return for their labor, while others were paid from 15 to 40 cents per hour in addition to receiving the noon meal. It is interesting to find that the most efficient program, from the standpoint of number of pupils served per man hour worked and low labor cost per meal, was the one using neither pupil nor volunteer labor. In this school, four paid adults working 28 hr. served a total of 442 pupils.

Mothers who volunteered their services to the two elementary school lunch programs assumed full responsibility for general management, making all wholesale food purchases, keeping records, and paying bills.

Home economics teachers managed three of the school lunch programs and in two others served as consultants to full-time managers who had had no previous training in school lunch management. One school lunch was managed by the cook. Only one lunchroom had a full-time manager with a degree in home economics. One home economics teacher-manager had training in quantity cookery and had experience in tea room management. Three programs operated without assistance from a trained person. The amount of time the home economics teachers could devote to school lunch management was limited to approximately 1 hr. each day which left much responsibility to the cook. Time spent on the lunch program by the home economics teachers was not charged against school lunch operation. Salaries of full-time managers, however, were paid from the lunch funds, but these managers also assisted with the preparation and serving.

In one school the teachers had no lunch duties. In another, four selected teachers were in charge of the dining room during the lunch period. The teachers of other schools were responsible for supervising their own classes on the way to the dining room and while eating. In one school the commercial teacher helped with school lunch record keeping.

Principals emphasized the importance of reaching a definite understanding with teachers at the time of employment as to their required school lunch duties. Most principals considered the time spent by teachers with their pupils during lunch as a regular part of the school day.

SERVING PERIODS

The length of the total serving period was from 1 to 2 hr., and the number of serving shifts ranged from two to six. Shifts frequently overlapped to allow younger children time to finish eating. Although the number of serving shifts is directly related to the seating capacity of the dining room, the tendency seemed to be toward frequent shifts to prevent congestion in the halls and long waits in the serving line.

The number of pupils served per minute at the peak of service in the nine schools ranged from six to fifteen. Bryan (3) suggests that at a 15- to 20-ft. counter it is possible to serve from twelve to fifteen pupils per minute with a plate lunch, dessert, and beverage. Speedy service is desirable to allow time for leisurely eating or some time for play in the average length lunch period. The serving of a planned meal with little or no choice usually expedites the service.

DISH SANITATION

Little uniformity was found in dish sanitation methods. Four schools had dish machines, four had two- or three-compartment sinks, and one school used two portable galvanized wash tubs for washing and rinsing dishes, pots, and pans. All schools had supplies of running hot water which reached the recommended temperature of 180° to 190° F., but there was a tendency to continue to use wash and rinse water after it had cooled below the desired temperature. In one school dishes were washed and rinsed in a two-compartment sink and then placed in racks and put in a single-tank dish machine for a final hot sanitizing rinse. In three schools dishes were sanitized in a chemical solution after washing and rinsing. Only one school had enough dishes, dish racks, and clean dish table space to air dry dishes, so that towel drying was necessary in eight schools. No school pre-rinsed soiled dishes, although all scraped plates before stacking.

RECORDS

All schools had kept records of income and expenditure, although too few analyzed their records for use in planning future operations. Few schools took into account the value of the food inventory. Most of the schools waited until the close of the school year to compute gain and loss.

The records of one elementary school had been analyzed by a certified public accountant, and a summary of income and expenses had been prepared, showing free and paid lunches and current operations in comparison with those of the previous year. In addition, food purchases had been classified according to ten food groups.

SUMMARY

Information obtained through this study has shown high pupil participation in the school lunch programs, reflecting general acceptance of the program in the communities represented. The study has pointed out a wide range from school to school in meal costs and selling prices, great differences in calculated nutritive value of meals, and considerable variation in the amount of labor used and in management practices.

While this preliminary investigation included only a small number of schools, it has served as an approach toward a method of studying characteristics of school lunch management and limitations within which school lunch programs operate. Since school lunch facilities and management aspects have an important relation to the nutritional value of school meals, it is hoped that the significant criteria can be used in studies of larger numbers of schools.

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Japanese Develop New Type of Flour

A synthetic flour containing pumpkin seeds, seaweed, sagebrush, radish and sweet potato leaves was recently reported by the Office of Technical Services, U.S. Department of Commerce. This flour was developed by the Japanese Ministry of Agriculture to supplement the Japanese postwar food supply and is used to make bread, biscuits, and noodles. It has about the same caloric value as brown rice, although only about half of its nutritional value. It has a peculiar taste, however, and is mixed with two parts of wheat flour.—*From Food Field Reporter, April 14, 1947.*

Ascorbic Acid, Carotene, and Vitamin A Content of Residence Hall Food[1]

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THE purpose of the present study was to determine the amount of reduced ascorbic acid and of total vitamin A value of foods provided for students eating in one of the college residence hall cafeterias at North Texas State College. The dining room serves between 350 and 500 per meal.

PROCEDURE

The foods analyzed were obtained at the dormitory during the serving periods for one week. Actual servings of each of the foods were placed in a glass jar containing 1 per cent metaphosphoric acid. The fruits, fruit juices, salads, and desserts, as well as milk, were analyzed separately since the students were given a choice from which to select. The other food combinations, namely, the main courses of each meal, were determined by observing the most frequently occurring combinations selected by the students. These composite food samples were also placed in individual glass jars with 1 per cent metaphosphoric acid. All samples were subsequently mixed in the Waring Blendor. Aliquots of these blended samples were analyzed for reduced ascorbic acid, for carotene, and for vitamin A.

The Loeffler and Ponting (2) method of analyzing for reduced ascorbic acid was used.

The method of analyzing the individual and the composite food samples for carotene and vitamin A differed somewhat from that of Lesher and coworkers (1). In the present study a 20-gm. sample was saponified and extracted with ethyl ether instead of the ethyl alcohol and petroleum ether mixture. To prevent the formation of an emulsion, sodium sulphate was used (3), and the ethyl ether extract dried with sodium sulphate for 1 hr. The residue was redissolved in Skellysolve B and extracted with 90 per cent methanol (4), to remove xanthophylls. Instead of the adsorbent used by Wall and Kelley (3), activated alumina, recommended by Zechmeister and Cholnoky (5), was used in preparing the adsorption column for the chromatographic separation of the carotene from other pigments. This column was prepared in the same manner as that employed by Wall and Kelley (3) in the preparation of their column, and their eluting mixture of 5 per cent acetone in Skellysolve B was used for the carotene. The eluate of carotene was put into a 10-ml. photelometer tube and light transmission read through a 410-millimicron filter. These readings were compared with the standard carotene curve, which was prepared by dissolving 90 per cent beta and 10 per cent alpha carotene in Skellysolve B and diluted to known concentrations.

An eluate of a 9:1 mixture of Skellysolve B and methyl alcohol was used to remove the vitamin A from the adsorption column. This eluate was then combined with the carotene eluate and the solution evaporated to dryness. This residue was dissolved in chloroform. One ml. of this solution was shaken with 4.0 ml. glycerol 1,3-dichlorohydrin (G. D. H.) (the solvent used by Sobel and Werbin [6]), placed on water bath at 25° to 30° C., and read after 6 min. with a 550-millimicron filter. Six min. was the time allowed for reaction with the reagent, for at that time both vitamin A and carotene are stable. The above authors found that 1 gamma of carotene gives a color reaction equivalent to that produced by 0.49 I.U. of vitamin A. This correction was made on all solutions containing carotene.

For the calculation of the International Units of carotene in the foods, the micrograms of carotene were divided by 0.6, Lesher *et al.* (7). Since crystalline vitamin A acetate was used for the standard curve, and vitamin A represents 87 per cent of this, it was necessary to multiply the values obtained photometrically by 0.87 and then by 4.3 to convert to International Units.

In this study the 410-millimicron filter gave recoveries in carotene concentration of 92 to 100 per

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cent, with an average of 97 per cent. The simultaneous determination of crystalline vitamin A recovery ranged from 88 to 106 per cent, with an average of 95 per cent. These recoveries compare favorably with the 98 and 101 per cent for carotene and vitamin A, respectively, reported by Lesher *et al.* (1).

From observation of Table 1 it is evident that the selection of the fruit at the breakfast meal is important in determining the total reduced ascorbic acid in the day's intake of food. The fruits available ranged from 4 mg. per 100 gm. for banana to 75 mg. for an orange. The value obtained for the pineapple juice (26 mg.) was the highest obtained in this laboratory. The values previously obtained were around 10 mg. for a 100-gm. serving. It will be noted that the salads furnished from 5 to 8 mg. per serving and that the desserts contained no ascorbic acid.

When the composite food samples of the main courses of each meal were considered, we found that unless cabbage slaw was included with the main courses, the ascorbic acid obtained from the main course did not exceed 13 to 15 mg., whereas when the cold slaw was present, one might obtain as much as 25 to 40 mg. of ascorbic acid. From these data one may conclude that, if a person does not get the major portion of his ascorbic acid at the breakfast meal, it is difficult to meet this daily requirement. The days' menus in this cafeteria are not available in the morning when the breakfast selection is being made. Consequently, it must be assumed that the ascorbic acid at the breakfast meal will supply the major portion of the day's intake.

The statements applied to ascorbic acid do not apply to the total vitamin A value of the foods served at breakfast since this meal furnished the least of any of the main courses analyzed—from approximately 384 to 833 I.U. (Table 2). The total available vitamin A was calculated as vitamin A plus 75 per cent of the carotene (Lesher *et al.* [1]). The dinners as a whole furnished the largest amount of vitamin A and the suppers next. Only one supper was as low as breakfast, and that was Supper 2, composed of ham, peas, and canned apricots. Both the carotene and vitamin A varied greatly from menu to menu. There was no consistency between the carotene and the vitamin A furnished by specific meals outside of the breakfast, which had a uniformly low carotene value of 35 to 45 I.U. The breakfast which included

TABLE 1

Vitamin content of some individual foods

FOODS	AMOUNT OF SERVING	ASCORBIC ACID	CAROTENE	VITAMIN A	TOTAL VITAMIN A VALUE*
	gm.	*mg.*	*I.U.*	*I.U.*	*I.U.*
Pineapple juice	102	26	—	152	152
Grapefruit juice	85	38	—	7	7
Banana	62	4	—	31	31
Orange	99	75	61	308	354
Tomato juice	68	14	623	87	554
Cantaloupe	66	15	353	1819	2084
Lettuce and tomato salad	45	5	159	630	749
Congealed fruit salad	74	8	—	—	—
Congealed lemon salad	86	6	—	—	—
Mixed fruit salad	88	6	65	296	345
Vegetable salad	50	7	99	680	754
Coconut pie	106	—	—	382	382
Chocolate pie	87	—	—	1829	1829
Vanilla ice cream	57	—	—	171	171
Milk	244	—	—	732	732

* Total vitamin A value is equal to vitamin A plus 75 per cent of carotene.

TABLE 2

Vitamin values of composite food samples

FOODS INCLUDED IN SAMPLE	TOTAL CONTENT OF MEAL	ASCORBIC ACID	CAROTENE	VITAMIN A	TOTAL VITAMIN A VALUE*
	gm.	*mg.*	*I.U.*	*I.U.*	*I.U.*
Breakfast 1					
Scrambled eggs, toast, cereal, and milk	270	—	45	799	833
Breakfast 2					
Scrambled eggs, toast, and doughnut	112	—	35	358	384
Dinner 1					
Liver, sweet potatoes, corn muffin, and spinach	248	13	5787	6609	10,949
Dinner 2					
Hash, sweet potatoes, spinach, and corn muffin	259	13	2432	89	1913
Dinner 3					
Hash, blackeyed peas, and cabbage slaw	219	25	320	885	1125
Dinner 4					
Fish, spinach, and beets	186	13	570	1227	1655
Supper 1					
Macaroni and cheese, peas, and canned apricots	167	15	1229	29	950
Supper 2					
Ham, peas, and canned apricots	189	15	566	—	425
Supper 3					
Meat pie, pinto beans, and dried apricots	267	15	752	1292	1856
Supper 4					
Blackeyed peas, cabbage slaw, and dried apricots	238	40	836	1104	1731

* Total vitamin A value is equal to vitamin A plus 75 per cent of carotene.

TABLE 3

Vitamin values of seven typical days' menus

MENUS*	ASCORBIC ACID	TOTAL DAILY ASCORBIC ACID	VITAMIN A	TOTAL DAILY VITAMIN A VALUE**
	mg.	*mg.*	*I.U.*	*I.U.*
Breakfast 1 + banana	4		864	
Dinner 1 + congealed fruit salad and vanilla ice cream	21		11,120	
Supper 1 + vegetable salad and coconut pie	22	47	2086	14,070
Breakfast 2 + banana	4		415	
Dinner 4 + lettuce and tomato salad and chocolate pie	18		4233	
Supper 3 + mixed fruit salad and vanilla ice cream	21	43	2372	7020
Breakfast 2 + grapefruit juice	38		391	
Dinner 2 + congealed fruit salad and chocolate pie	21		3742	
Supper 2 + congealed lemon salad and vanilla ice cream	21	80	596	4729
Breakfast 1 + pineapple juice	26		985	
Dinner 1 + lettuce and tomato salad and coconut pie	18		12,080	
Supper 1 + congealed fruit salad and vanilla ice cream	23	67	1121	14,186
Breakfast 2 + grapefruit juice	38		391	
Dinner 2 + mixed fruit salad and coconut pie	19		2640	
Supper 2 + lettuce and tomato salad and vanilla ice cream	20	77	1345	4376
Breakfast 1 + whole orange	75		1187	
Dinner 3 + mixed fruit salad and chocolate pie	30		3299	
Supper 3 + congealed lemon salad and vanilla ice cream	21	126	2027	6513
Breakfast 2 + cantaloupe	15		2468	
Dinner 4 + congealed fruit salad and vanilla ice cream	21		1826	
Supper 4 + vegetable salad and vanilla ice cream	47	83	2656	6950

* See Table 1 for vitamin values of individual foods. See Table 2 for composition and vitamin values of various meals.

** Total vitamin A value is equal to vitamin A plus 75 per cent carotene.

milk had the higher vitamin A content, 799 I.U. As one might expect, liver contributed a large amount of vitamin A as well as carotene, since Dinner 1 and Dinner 2 varied only in the kind of meat. The entrée for Dinner 1 was liver, for Dinner 2, hash. Dinner 1 provided 6609 I.U. of preformed vitamin A as compared with 89 for Dinner 2. Only one meal, Supper 2, contributed no vitamin A, but it offered 566 I.U. of carotene. Supper 1, which was the same as Supper 2 except that it included macaroni and cheese in place of ham, had 29 I.U. of vitamin A and almost double the amount of carotene. Suppers 3 and 4, although unlike except for the dessert, furnished somewhat similar amounts of carotene and vitamin A. It is evident from these figures that it is not a difficult thing to meet the total vitamin A value requirement.

Table 3 gives the combinations which the students most frequently selected. The two days' menus, 2 and 1, which included the banana at each of the breakfasts, gave the lowest reduced ascorbic acid values. Thus there were only two out of seven daily selected combinations which were too low.

The total vitamin A content of these same diets ranged from 4376 to 14,186 I.U. Lesher *et al.* (1) reported intakes of 2.95 to 3.20 mg. which were calculated to be the equivalent of 12,688 to 13,760 I.U.

SUMMARY

The choice of the fruit at the breakfast meal usually determined the adequacy of the total reduced ascorbic acid in the diet. Self-selected diets tended to meet the daily recommended allowance of vitamin A value foods.

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Retention of the B Vitamins in Beef and Lamb After Stewing[1]

V. Riboflavin

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THE MEAT was prepared and cooked as described in the first paper of this series (1). The riboflavin phase of the study is reported here. Riboflavin was determined on papain-takadiastase extracts from which the fat had been removed with chloroform, and the proteins by precipitation at *p*H 6.8 to 7.0. The microbiological procedure of Snell and Strong (2) was used with modifications in the preparation of the sample to eliminate the effect of foreign growth stimulants.

CONTENT

The average riboflavin content for raw meat and for meat cooked by the twelve stewing methods is given (Table 1).

The riboflavin values for raw beef obtained in this study ranged from 1.90 to 2.35 mcg. per gram. They fell within the range of 0.41 to 3.5 mcg. per gram reported by Brady, Peterson, and Shaw (3); Cheldelin and Williams (4); Cheldelin and Williams (5); Cover *et al.* (6); Munsell (7); and Waisman and Elvehjem (8). The mixed muscles of brisket in the present study averaged 2.15 mcg. per gram, which is somewhat higher than averages of 1.2 and 1.6 mcg. per gram obtained for beef ribs by Cover *et al.* (6). In the present study the fat was largely removed when the meat was cut for stews, but it was not removed in the work on beef ribs. If fat contains little or no riboflavin, removal of the fat would increase the apparent content.

The riboflavin values for raw lamb obtained in this study ranged from 2.07 to 2.52 mcg. per gram with an average of 2.25 mcg. These results were in the upper range of 0.69 to 2.95 mcg. per gram reported by Cheldelin and Williams (4); Cheldelin and Williams (5); McIntire and co-workers (9); Munsell (7); and Waisman and Elvehjem (8).

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RETENTION

Retentions were calculated on the dry, fat-free basis. The average retention varied somewhat among the different stewing methods (Table 2). The range in the meat was between 62 and 69 per cent and in the broth from 28 to 57 per cent.

When the average total retention of riboflavin is considered, the range was from 96 to 120 per cent for beef and from 100 to 124 per cent for lamb. These high retentions were in line with the findings of many workers for cooked meat. To see whether the cooked values were significantly higher than those for raw meat, analyses of variance were made between the dry, fat-free values of raw meat and those for cooked meat plus broth. When the statistical treatment was based on all the values for raw meat vs. all the values for cooked meat, the difference was significant for beef and highly significant for lamb. An F value of 10.91 was obtained for beef when a value of 6.61 at the 0.05 level would be significant. The F value for lamb was 29.45, with a value of 16.26 required at the 0.01 level (highly significant). In general, then, the high riboflavin retentions were not accidental.

To determine whether the significantly higher retentions were associated with a definite cooking process, the mean difference in actual content between raw and cooked meat was computed for each of the twelve stewing methods (Table 2). Significant differences by the t-test occurred in six of the twelve methods for lamb and in four of the twelve methods for beef. They were associated with retentions of higher than 110 per cent. All of the ten significant differences occurred with the larger amount of water, and all three of the highly significant differences occurred with meat which was not browned. It was not clear how the large amount of water could have influenced the release of foreign growth stimulants or have freed more riboflavin from a hypothetical, bound form.

The completeness of enzymatic digestion in raw beef and lamb was probably not the cause of the high retentions If it had been, at least some of the significantly high retentions should have occurred with the smaller amount of water.

An effort was made to locate the source of the higher retention of riboflavin associated with the larger amount of water. Because treatments with the two amounts of water were done on different days, there was a slight possibility that some unnoticed laboratory condition was responsible. In view of this, it is fortunate that a total of four raw samples were analyzed for each replicate, two on the day the large amount of water was used and two on the day the small amount of water was used. Thus the effect of laboratory conditions on the raw samples could be observed. There was no significant difference between the two days on which the analyses were done when order of analysis was considered. However, the order of analysis had been alternated for the two treatments, and the raw values arranged by order of analysis would not contrast the laboratory conditions under which the two treatments were analyzed. For this reason the four values for each replicate of each kind of raw meat were arranged in the purely arbitrary manner of their association with the two cooking treatments (large versus small amount of water). Nevertheless, an analysis of variance of this arrangement showed no significant difference for lamb. It would appear, therefore, that the higher riboflavin values obtained for lamb stews cooked in the larger amount of water were probably not associated with unusual lighting conditions in the laboratory. However, for beef the analysis of this difference was barely significant. There may have been some laboratory condition favoring high riboflavin values on the days the larger amount of water was used for beef, though the authors know of no condition which could have been responsible for this difference.

The actual content of the cooked stews was analyzed by variance to show which procedures were related to loss of riboflavin. These F values together with the total retentions averaged in this way are given in Table 3.

Browning the meat for stews lowered significantly the riboflavin content of the entire cooked stew (Table 3). This is of doubtful practical importance, however, because the brown stews contained only 3 or 4 per cent less total riboflavin than the light stews (Table 4). Moreover, the average total retentions

TABLE 1

Average riboflavin content of beef and lamb stews

VARIABLES	RIBOFLAVIN*							
	Beef				Lamb			
	Moist basis	Dry, fat-free basis			Moist basis	Dry, fat-free basis		
	Meat	Meat	Broth	Meat and broth	Meat	Meat	Broth	Meat and Broth
	mcg./gm.	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*
Raw	2.15	10.38		10.38	2.25	11.40		11.40
Cooked with a large amount of water								
Browned								
Pressure-cooked	2.26	6.81	4.44	11.25	2.44	7.63	5.53	13.16
Boiled	2.03	6.48	4.78	11.26	2.30	7.54	6.41	13.95
Simmered	2.08	7.16	5.21	12.37	2.24	7.37	6.36	13.73
Not browned								
Pressure-cooked	2.22	7.05	4.78	11.83	2.48	7.89	6.16	14.05
Boiled	1.93	6.97	5.46	12.43	2.09	7.10	6.47	13.57
Simmered	2.04	6.73	5.22	11.95	2.18	7.63	6.53	14.16
Cooked with a small amount of water								
Browned								
Pressure-cooked	2.37	7.09	2.92	10.01	2.55	7.75	3.66	11.41
Boiled	2.16	6.81	3.16	9.97	2.40	7.63	4.47	12.10
Simmered	2.29	7.20	2.87	10.07	2.48	7.71	3.79	11.50
Not browned								
Pressure-cooked	2.23	6.95	3.75	10.70	2.42	7.56	4.48	12.04
Boiled	2.19	7.00	3.74	10.74	2.29	7.43	4.58	12.01
Simmered	2.08	6.89	3.28	10.17	2.28	7.60	4.86	12.46
Average for all cooked stews.....				11.06				12.84

* Each value of raw meat is the average of four samples for each of six replicates. Each value of cooked meat is the average of six replicates.

TABLE 2

Retention of riboflavin and mean difference between content of raw meat and cooked stew

VARIABLES	RIBOFLAVIN							
	Beef				Lamb			
	Retention†			Mean difference between content of raw meat and cooked stew‡	Retention†			Mean difference between content of raw meat and cooked stew‡
	Meat	Broth	Total		Meat	Broth	Total	
	%	%	%	*mcg./gm.*	%	%	%	*mcg./gm.*
Cooked with a large amount of water								
Browned								
Pressure-cooked	66	43	109	0.87	67	49	116	1.76*
Boiled	62	46	108	0.88	66	56	122	2.55*
Simmered	69	50	119	1.99*	65	56	121	2.33*
Not browned								
Pressure-cooked	68	46	114	1.45*	69	54	123	2.65**
Boiled	67	53	120	2.05**	62	57	119	2.17*
Simmered	65	50	115	1.57*	67	57	124	2.76**
Cooked with a small amount of water								
Browned								
Pressure-cooked	68	28	96	−0.37	68	32	100	0.01
Boiled	66	30	96	−0.41	67	39	106	0.70
Simmered	69	28	97	−0.31	68	33	101	0.10
Not browned								
Pressure-cooked	67	36	103	0.32	66	39	105	0.64
Boiled	67	36	103	0.36	65	40	105	0.61
Simmered	66	32	98	−0.21	67	43	110	1.06
Average for all stews.....			106.4				112.6	

† Calculated on dry, fat-free basis. Each value is the average of six replicates.

‡ Riboflavin content of cooked meat plus broth minus that of raw meat.

* Significant difference. Mean difference required for significance at 0.05 level for beef was 1.29; for lamb, 1.67.

** Highly significant difference. Mean difference required for significance at 0.01 level for beef was 2.02; for lamb, 2.62

TABLE 3

Average retention of riboflavin according to cooking variables and statistical evaluation of findings

VARIABLES†	AVERAGE RIBOFLAVIN RETENTION						F VALUE‡					
	Meat		Broth		Total		Meat		Broth		Total	
	Beef	Lamb	Beef	Lamb	Beef	Lamb	Beef	Lamb	Beef	Lamb	Beef	Lamb
	%	%	%	%	%	%						
Browned	67	67	38	44	105	111	0.00	2.11	10.41*	19.21**	9.80*	34.37**
Not browned	67	66	42	48	109	114						
Pressure-cooked	67	68	38	44	105	112	1.82	5.64	2.07	21.95**	0.49	4.98
Boiled	66	65	41	48	107	113						
Simmered	67	67	40	47	107	114						
Large amount of water	66	66	48	55	114	121	0.09	0.11	35.91**	85.80**	22.40**	19.02**
Small amount of water	67	67	32	38	99	105						

† Number of samples averaged was: browning, 36; temperature, 24; and water, 36.

‡ Calculated from content on dry, fat-free basis only. Error terms were the first order interactions of the variables x replicates.

* Significant difference. F values needed for significance at the 0.05 level were: browning, 6.61; temperature, 5.79; water. 16.26.

** Highly significant difference. F values needed for significance at 0.01 level were: browning, 16.26; temperature, 13.27; water, 16.26.

for neither light nor brown stews were below 100 per cent.

Temperature of cooking did not significantly affect the riboflavin content of the entire cooked stew in either beef or lamb (Table 3). This was expected because riboflavin is stable to heat.

The *amount of water* in which the stews were cooked caused a highly significant difference in total riboflavin of both cooked beef and cooked lamb (Table 3). However, both beef and lamb stews with the larger amount of water actually contained about 15 per cent more total riboflavin than those with the smaller amount of water (Table 4). That the difference in riboflavin content of the entire cooked stews was caused by differences in broth is shown by the high F values for the broth and the low F values for the meat (Table 3). The broth from the stews with the larger amount of water actually contained about 50 per cent more riboflavin than those with the smaller amount of water (Table 4). The difference in the meat, however, was less than 2 per cent. Why the difference in broth content was so great when accompanied by such similar meat content is not clear. This leads to the conclusion that broth differences were responsible for the significantly higher retentions with the larger amount of water, as noted above.

Riboflavin was not equally divided between the meat and the broth (Table 5). More of it was in the meat than the broth, irrespective of the amount of water used for cooking, but the larger amount of liquid appeared to extract more of the vitamin, as is the usual trend.

A dietary allowance of 2.0 mg. of riboflavin is recommended by the Food and Nutrition Board of the National Research Council (10) for moderately active men. Since a little over 0.2 mg. of riboflavin was found per 100 gm. of raw beef or lamb, and none was lost during stewing, a serving of meat stew (125 gm. raw) would furnish about 10 to 15 per cent of the daily allowance of riboflavin.

TABLE 4

Differences in riboflavin content associated with cooking variables

VARIABLES	RIBOFLAVIN CONTENT*					
	Meat		Broth		Total	
	Beef	Lamb	Beef	Lamb	Beef	Lamb
	mcg./gm.	mcg./gm.	mcg./gm.	mcg./gm.	mcg./gm.	mcg./gm.
Browned					10.82	12.64
Not browned					11.30	13.05
Difference					0.48	0.41
Percentage of difference**					4	3
Large amount of water	6.87	7.53	4.98	6.24	11.85	13.77
Small amount of water	6.99	7.61	3.29	4.30	10.27	11.92
Difference	0.12	0.08	1.69	1.94	1.58	1.85
Percentage of difference†	1.7	1.1	51.4	45.1	15.4	15.5

* On dry, fat-free basis. Each value is the average of thirty-six samples.

** Content of not-browned stew was considered 100 per cent.

† Lower content value was considered 100 per cent.

CONCLUSIONS

(a) No destruction of riboflavin occurred during stewing.

(b) Riboflavin retentions of more than 100 per cent were obtained. An analysis of variance showed in both beef and lamb that there was significantly more riboflavin in the entire cooked stew than in the raw meat. When the average difference between raw and the entire stew cooked by each procedure was subjected to the t-test, significant differences were found for six of the twelve cooking procedures for lamb and four of the twelve procedures for beef. Retentions above 110 per cent were significantly above 100 per cent. Only the procedures using the larger amount of water showed significant increases above 100 per cent.

(c) Browning lowered the total riboflavin content to an extent which was statistically significant. However, the brown stews contained only 3 or 4 per cent less total riboflavin than the light stews, and hence this is of doubtful practical importance.

(d) Temperature of cooking had no effect on the total content of riboflavin.

(e) The amount of water used for stewing had a significant effect on the total riboflavin content.

TABLE 5

Distribution of riboflavin between meat and broth

AMOUNT OF WATER	DISTRIBUTION OF RIBOFLAVIN†		F VALUE‡
	Meat	Broth	
Beef			
	%	%	
Large	58	42	24.57**
Small	68	32	60.47**
Lamb			
Large	55	45	11.75*
Small	64	36	135.09**

† Each value is the average of thirty-six samples.

‡ Calculated from the dry, fat-free content of cooked stew. Error terms were first order interactions of the variable x replicates.

* Significant difference. F value needed for significance at the 0.05 level was 6.61.

** Highly significant difference. F value needed for significance at the 0.01 level was 16.26.

The stews with the larger amount of water had the higher content. The difference occurred in the broth but not in the meat for both beef and lamb stews.

(f) The extent of extraction of riboflavin from the meat into the broth was affected by the amount of cooking liquid. The larger amount of liquid extracted more of the vitamin, as is the usual trend. However, somewhat more of the vitamin was in the meat than in the broth irrespective of the amount of water used for cooking.

(g) A serving of meat stew (125 gm. raw) would furnish about 10 to 15 per cent of the daily recommendation for riboflavin. When the stews were cooked in enough water to cover the meat, not quite half of the vitamin was in the broth. It is, therefore, advisable to conserve all of the broth.

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Railroad Food Service

The speaker at the May meeting of the Nebraska Dietetic Association in Omaha was Grace Merrill, supervisor of dining car service, Union Pacific Railroad. Excerpts of her talk concerning food service on railroads are quoted below:

"Before World War I everything on railroad dining car menus was à la carte, but when the government took over the railroads, menus were changed to table d'hôte meals to conserve supplies. After returning to private ownership after the war, the railroads tried à la carte service, found that it wasn't accepted by the public, and then went back to table d'hôte service. They have since added the entrée-selected meal in which the price of the entrée determines the cost of the meal.

"The Union Pacific has offered many famous types of service. Before the war just ended the meals on our Challenger trains were planned on the theory that less variety and better preparation would enable us to serve meals at a lower cost to the passenger. We offered for breakfast a combination of fruit, ham or bacon, two eggs, toast, and coffee for 25 cents, and for dinner a complete turkey dinner with all of the 'trimmings' was served for 35 cents.

"The prewar continental service of our streamliner City of Los Angeles was most elaborate. The steward contacted the passenger and determined the time he wished to dine—whether the first, second, or third sitting. When the guest arrived in the diner, he made his choice of food from platters of food passed by the waiters rather than from a menu. This was a seven-course dinner, including wine and an after-dinner liqueur.

"We will probably never again see these elaborate menus and service of former years. Several months ago when riding on a train going through Idaho, a sheep rancher sat down beside me in the diner. Without looking at a menu he ordered ham and eggs, toast, and coffee. The waiter asked, 'Do you want that on the table d'hôte or do you want it on the à la carte?' The rancher looked up, and in his rough voice said, 'I want it on the plate so that I can eat it.' I feel that is what most people want—their food on a plate and not a lot of silver service.

"Operating costs in the dining car department have greatly increased since the first world war, as have costs in general. For instance, in 1912 our very ornate diners with individual coffee percolators, egg boilers, toasters, and silver service cost $19,000 complete. Today the diners on order will cost $135,000. The linen alone costs over $10,000 a car, and cotton table cloths cost more than $6,000 per diner. The silver costs $8,000.

"In 1946 the Union Pacific served 7,154,000 meals in dining cars and an additional 5,500,000 in our restaurants. Yet, we did not show a profit on these operations, for 73.1 per cent of every food dollar was spent for wages and 51.6 per cent for food."

Psychic Income for Employees[1]

HELEN ESRAY-CHASE

Associate Personnel Analyst, Personnel Council, New York State Department of Civil Service, Albany

EVERYONE who works for a living receives three incomes. First, there is the cash income, which is the microscopic check paid at fairly regular intervals. Second, there is the real income, which is the goods and services for which the employee would have to pay, if they were not furnished as part of the job—lower priced meals and lodgings, the use of tennis courts, medical care, pension plans, the use of a car, time with pay for sickness, and so on. Third, there is the psychic income which is an intangible thing but is the real reason most people work. It is the satisfaction of the job. The ways in which people are robbed of their psychic income by their superiors, subordinates, and equals are many and subtle. It is with the hope of helping you to spot the thieves and to protect your income that this paper is presented.

Normally, people expect security, prestige, and a place of dignity in the community and organization. They insist upon an outlet for their creative desires. They want to belong to a group which accepts them and respects them and is important in its own right. They feel entitled to appreciation for a job well done. It is easy for us, unfortunately, to deprive our associates of their just due without being arrested for larceny.

We have all interviewed a person we felt to be the perfect candidate for a job. She came with a complete record of her education and her professional life. She had transcripts of her college record and graduate courses. She had copies of everything she had written: her plans for teaching, the material she had developed for the use of the administration, the speeches she had given—all were neatly filed in a single loose-leaf notebook. She had even been bright enough to keep the "thank you" notes that were written to her when she had done a "swell job." She knew the exact dates she worked in each place and the name of her supervisor and where that person is now. Ordinarily she could even explain what she consciously wanted in a job. Yet when we interviewed her we had a feeling of frustration and we said to ourselves, "She has what we want, but do we have what she wants at this particular stage of her development and in her present frame of mind?" We had an uneasiness that we would be guilty of a breach of contract to hire her and then default in the payment of the plus values she demanded on the job.

Security in an employment situation depends to some extent on the employee's self-confidence, but to a far greater extent on his relationship to his superiors and his colleagues.

Over his self-confidence others have little control except in their capacity as "builder-uppers" rather than "tearer-downers." Professional people appreciate their own abilities and know that the present job is not the only one in the world. They know there are others, and that they can find a suitable one, if the need arises. Even the depression-bred people are recovering from fright and are serene in knowing that they have mastered their craft and have a skill for which the world will pay them. Fortunately for those of us concerned with the high cost of labor turnover, they are usually aware that the perfect job does not exist and often consciously balance various jobs against each other deciding to take their losses in the present situation until those losses exceed any possible profit from the experience.

The "higher-ups," however, have a definite responsibility to safeguard the par values of their staffs' current psychic securities.

The first payment in job security is to know what is expected and when it may be considered to be well done. In personnel language, it is called, "Receiving a job sheet and a standard of performance." In most organizations today a new employee is given an exact description of his duties, responsibilities, and the amount of authority which has been delegated to him. He is also told to whom he is directly responsible and what that person will consider an adequate or outstanding performance. But all too often an administrator does not accept the fact that knowledge of the job is not enough to insure complete emotional security. He fails to understand the depend-

[1] Presented at the 16th Annual Convention of the New York State Dietetic Association on May 23, at Lake Placid.

ent relationship of subordinates and the feeling of insecurity that this dependency arouses. Too often he relies on situational authority rather than on dynamic leadership. Because a man is a superintendent of a hospital, his staff, of necessity, accept his decision, but many are unaware of the fact that the acceptance is due the superintendent whether he is Doctor A or Doctor B. The deference is due the job, not the person.

Yet it is on the "fighting point" of the administrator's personality that the staff depends. That point is not inherent in the job. By the time a man has developed enough to be responsible for the acts of others, he has developed a philosophy of what he will accept peacefully in a business situation and what he will fight for or against.

A tale of two supervisors will illustrate what is meant by a "fighting point." In one organization the question arose of moving from a light and airy office in the firm's main building to another which had no view, no air, no light, no heat in winter, no breeze in summer. It was necessary for the good of the organization that some of the staff be put in these undesirable quarters. The supervisor with a low fighting point dashed in to protect his staff's concept of their own prestige. Another supervisor stormed and bewailed his fate and stated that he was powerless to do anything to keep his staff where they felt they functioned best. The moving in and of itself, of course, was unimportant. It was a matter of prestige, his staff felt, to stay in the main building and a matter of security in their relations to him to know he would be "papa" and take care of them when they hadn't enough rank to do it themselves. The first group said, "Well, you know our Phil. He never lets us down." The second supervisor could undoubtedly have made his staff feel protected by having a conference and saying that for certain reasons he and they were moving for the good of the firm and for the proper functioning of the department. He knew that the prestige of the group was so high that a mere geographic location was unimportant and they were one of the few units of which this was true. The error was in agreeing that they were being "shoved around" and that he was powerless to prevent it. It pauperized the group as far as faith in the strength of the leader was concerned.

You can, of course, illustrate from your own experience by recalling the times when you have taken a completed project to your supervisor and then waited days because he could not or would not get other interested persons to take the needed action. It is not easy to complete a job and then feel that it is abandoned because you have taken it to your supervisor and can do nothing further. It is especially difficult when the necessary action becomes inaction.

There are other ways in which administrators rob their staff of security. There is the unpredictable supervisor who is angry one moment at a mistake which amuses him the next; the supervisor who acts first and tells afterwards—or may never tell at all—why a certain course of action was taken; the supervisor who does not know how to tell you what to do, when to do it, why to do it, where to do it, and how to do it.

And, there is always the supervisor who trusts the rumor route instead of giving direct information. Have you ever felt that across the coat-of-arms of any large organization there should be emblazoned the rallying cry and the motto "Nobody tells me anything"? The bewildering feeling that much is going on around us and we don't know what it means is felt by everyone from messengers to division heads.

At one time a stenographer always busied herself about the boss' desk, reading things that were no particular concern of hers. She felt apparently that things were going on all around her that she did not understand. She was afraid that some of them might affect her job. She was terrified that some of this material might be used against her. She genuinely trembled over a mistake she might have made and not caught, so she looked through everything carefully to be sure that she was not going to lose her job. Then her supervisor explained everything to her each morning, thus assuring her that she was given all she needed to know in order to do her work, and she was content.

With his staff members he decided that the spirit of "nobody tells me anything" was entirely too prevalent to maintain an atmosphere of harmony. There was too much time wasted in listening to rumors and in speculating upon whether they were true. He knew that in any organization bigger than three people there will be rumors. To keep them at a minimum he inaugurated informal staff meetings every morning so that everyone would know what everyone's plans were through the day and what had happened. He has never been known to hold out any pertinent information, pleasant or unpleasant, and his staff have complete confidence in him and, therefore, in their jobs. He now informs by carbon when he has been unable to call a conference. As far as security goes, his staff has been paid in full and can demand nothing more.

In the development of American organizations the emphasis has been on straight-line supervision. Each person, we are told, should ideally be responsible to only one person. The woes of being functionally responsible to one person and administratively responsible to another, have been stressed until we all feel abused when dual supervision creeps into our work. Volumes have been written on the problems inherent in such a set-up. It is bewildering to have a program built by one person, with its effectiveness dependent on another. For instance, it is hard on a worker to have a director of social work say, "This is what must be done for patients and this is how it is to be done"; and to have the director of the hospital

say, "This is when it is to be done, where, and this is all the money available for it; but I would rather you did something else first." Fortunately for most of us, the consultants on the program and the administrators get along with each other and can work out their problems together. But, when the personalities involved are such that the worker who actually does the job must also referee their disputes, she is justified in feeling that an unfair amount of the values of the job are being destroyed.

The supervisor who takes the attitude, "This is an order," also takes part of the joy of creation away from his staff. It is as easy to say, "May we discuss our problem?" so that the employee feels that the supervision is the result of the consultation and not arbitrarily a course of action superimposed upon him.

Equals, too, frequently ignore each other's claims to full information. Every organization has at least one person who hoards data as though parting with it would impoverish him through eternity. The attitude seems to be, "If I tell you what I know, then you will have what I know plus what you know and I will not be as valuable to the firm." These are the people who send you scurrying on a treasure hunt for the hidden facts which should have been handed to you. It seems extravagant to hide them when they should have been banked in a joint account. It is tragic that some of our colleagues must clutch pennies of knowledge as though they were beggars dependent on such small coins.

It is not only the supervisors who are bandits, however. Have you met the empire builders who make smash-and-grab raids on other people's jobs and responsibilities, hopefully building their own prestige with the stolen duties? The raid is usually preceded with, "You are too busy to do all this; let me help you." The victims feel just as a despoiled country feels—unappreciated and unnecessary. People change jobs as much as jobs change people, and the quiet cooperative friend may turn into a threatening tyrant after a successful raid, or an adequate staff member may become a frightened rabbit because he isn't sure of the point at which his job may vanish. It is the fear of being robbed that stresses relationships on the same horizontal level in any organization.

A training director, for instance, may want to institute a program of teaching so that all of the staff may profit by mastering common tools and having a common body of working knowledge. The direct supervisor of the staff, who is probably on the same horizontal level in an organization chart, will argue that different things should be included in the training program even though that is not within his sphere of competence. He will argue that the time is not available when the training director wants it and that some other time will have to be arranged. He will say that too much time is being allowed for the activity, although the person planning the program is quite sure that it cannot be given in a shorter time. When this dispute is either carried up to another level in the organization or is carried on as a feud, each participant in the "fight" feels his own prestige is at stake, and to professional people prestige is more important even than money.

In any emerging profession, such as social work, dietetics, or personnel, the practitioners have been known to carry chips on their shoulders. The way out of the "lady-bountiful-do-gooder" class has been hard, and nothing must even seem to suggest that the job hasn't the status of law or medicine. That attitude was necessary and probably still is. This extreme sensitivity, however, may defeat its purpose in some ways, but it is something of which we all must be aware when we do not want to "shortchange" our co-workers.

At different levels of the organization and at different stages of emotional maturity of the staff, the stereotypes of status change. What are the visible evidences of being an "important person"? What constitutes a "glamor job"? Any employment agency can tell you of competent stenographers who refuse a large cash income in a wholesale warehouse, preferring an acre of desk in a room with a rug. It fulfills their idea of importance. They claim, of course, that it is "working conditions." Professional people want, nearly always, a private office and a private secretary as the tangible evidence of "having arrived." Some professional people have resigned from positions because they had to share a telephone. They want their opinions considered; they want to plan their own time at work; and they want to sign their own mail, so that their identities are not lost. They want to be consulted in policy-forming conferences; they want time to attend meetings of their learned societies; and they want their organization to have standing in the field they represent. It is important to them to have their published works receive appreciation in the organization they serve. The prophet without honor in his own country justifiably feels cheated. All these outward trappings are merely the payments on an inner need to have the world recognize their ability and their contribution.

There is one situation which is nearly akin to taking trifles from a beggar's cup. Have you ever heard anyone say, "I don't know her, she's just a clerk"—or a cook, or a charwoman, or a dishwasher, as the case may be. Workers in those fields demand from the job as much security, prestige, "belonging," appreciation, and opportunity to create as you and I. The monotony of the work can deaden the joy unless consciously the rest of the staff plan to include them. Include all of your workers when you hand out the psychic incomes.

It isn't only the bottom on an organizational pyramid that demands appreciation in addition to status. Have you fallen in with the "but" brigade of bandits? "She is a good speaker—*but* isn't her

voice awful!" "She is smart-looking, of course, *but* why doesn't she do something about her hair?" "She does get along, *but* it certainly isn't her brains." Putting your arm around her waist in order to put your hand in her purse seems the neatest way to rob your fellow citizen.

Appreciating the job done and the person who did it is part of our organizational responsibility. The pink geranium story is an almost perfect example of the demand for creative expression on the job—and appreciation of it. At one plant a gardener had been working around the grounds from the time it was built. Out of the mud and debris which were left when the contractors departed, he had patiently built a lawn and flower beds. No one inside had told him what to do. His demands for supplies were simple and the purchases made without question. The office staff and factory personnel always stopped to admire his handiwork, and he boasted that all his pink geraniums had come from one slip. Finally the customers' comments became so flattering that the superintendent and board of directors decided that a landscape architect should be called in and a real job done on the place. When the nursery men came to bring in new plants and shrubs, the gardener dashed into the personnel office demanding his time and quitting. He had been there twenty years. He was much too old to go anywhere else—and he was popular.

The personnel officer wanted to know why the sudden resignation. The whole program was expanding. He would have a bigger, better, more scientifically designed yard. The poor man burst into tears and said that his beautiful gardens were being destroyed, everyone liked them, they were lovely, and vandals were pulling up his pink geraniums. The whole factory took sides with him. It was an affront to them all, since each man had brought something of his own for old Joe to use. The nursery stock went back, the landscape architect was paid off, and Joe returned to his flowers. He supervised his son's education in gardening and the son now tends the pink geraniums, and all the salesmen and buyers, the factory employees, and the office staff stop to admire the most intimate of plant gardens.

All of us have a pink geranium somewhere on our desks which needs the tender care of our associates. We can only hope that administrators will not steal it from us when it begins to bloom. Or, if they do take it to put in a flower show, they label it properly, "Exhibit of Madame X."

It is sad but also comforting that all experience is universal, and in our otherwise law abiding lives, robbery of the psychic values of a job is committed every day and goes unpunished. An awareness of the bandits may indicate when we should cry, "Stop, thief!"

What Are Good Food Standards?

For years we in the home economics field have talked about good food standards. What do we mean when we talk so glibly of standards? Where do we learn them—in school, in the home, or on the job? Who establishes food standards? Who decides what is good and what is bad food? Is it just a term that sounds well to us, or do we really think about it? Sometimes we coin an expression, such as "food standards," and then talk about it so much that we lose contact with the original idea and it becomes so involved that its meaning is lost in actual practice.

Of course, we all know that good food standards means knowing what kind of food is palatable and attractively served, but due to the varied backgrounds of workers in the field, there is great confusion as to just what constitutes palatable food attractively served.

For instance, I think that good cream soup must be rich, well seasoned and flavored, and the thickness of 40 per cent cream. But, there are many people who have excellent food judgment who disagree definitely and think that cream soup should be much thicker in consistency. We have other disagreements, too. For instance, I like mashed potatoes fairly soft and whipped very light while others like them quite dry and stiff. Lemon meringue pie is perfect, in my judgment, when it bends slightly under the meringue, but others want it to stand up straight and stay that way after it is cut. Who is right and who decides what good food standards are?

When we finally analyze the term, doesn't it mean that good food is what you personally think is best in the way of preparation and serving, influenced somewhat by the opinions of the majority of people?—*From an address by Winifred Ellison, food production manager, Greenfield's and Mill's Restaurants, Detroit, given before the Detroit Dietetic Association.*

Editorial

NUTRITION AND DIETETICS IN THE MEDICAL CURRICULUM

New attention is being given by the medical profession to the importance of *nutrition* in scientific medicine and to the ways and means by which it may be incorporated into the curriculum. An understanding of these principles will be essential in medical practice, but they will not be enough. In order to give effective nutritional therapy, the medical student will need to translate these principles into a recommended daily food intake which is therapeutically appropriate, nutritionally adequate, easily available, and acceptable to the patient. Thus *dietetics* will play a vital part in the care of the patient with nutritional problems, both in connection with *diagnosis* and with *treatment*.

In diagnosis, the medical student will, of course, learn to discriminate between such changes as occur in the eyes, the tongue, the gums, the skin, and the bony contour as well as in the reflexes and nervous stability. Unfortunately, however, many of the changes are not specific for nutritional deficiencies. Confirmatory evidence is needed from laboratory findings and the diet history. And until laboratory procedures are made practical for general use, the chief reliance will need to be placed on the diet history.

However, an appreciation will be needed by the medical student of the high degree of skill required to obtain a reliable diet history. The patient's anxieties, fears, and misconceptions concerning diets and various foods will interfere with the reliability of a history. As a result, the attitudes of the patient must be learned and the purpose of a diet history carefully explained to insure reliability and accuracy in obtaining the history.

Furthermore, if a correlation is to be made with the laboratory and clinical findings, it is entirely insufficient to have only a qualitative indication of the food intake, such as might be gained from a recital of the menus for the day, or from a qualitative record of food intake. For this purpose, the diet history will have value only if there is a quantitative as well as a qualitative evaluation. It is in this respect also that the dietitian can make an important contribution. Tables of 100-gm. portions of foods must be interpreted in terms of the amounts of foods actually used by the patient and in terms of amounts needed for therapeutic purposes. Innumerable other considerations will enter into the accurate account of food intake, such as food combinations and recipes used by various foreign groups, additional sources of foods in gardens, as well as irregularities in food intake due to seasonal, holiday, and economic factors.

After diagnosis comes specific therapy. Obviously, the effectiveness of food therapy will depend upon a reliable translation of nutritional principles into foods that are therapeutically appropriate, nutritionally adequate, available, and acceptable to the patient. The acceptability of foods to the patient has been recognized as being the largest single factor in effecting a change in food habits. And since the patient's present food habits are generally made up of those foods which are of greatest acceptability, it follows that the fewer changes which are made in his present food habits, the greater will be the acceptability and the greater the success in therapy. This will mean that the rigidity of the printed "diet list" must be replaced with elasticity and flexibility in food recommendations. This, in turn, necessitates a practical knowledge of food composition, interchangeability of food, and food combinations.

How can the medical student be given an appreciation and knowledge of the various aspects of food therapy which must be utilized in changing food habits? It is pointed out in the four recent editorials in the *Journal of the American Medical Association* concerning the place of nutrition in the medical curriculum that it will probably be unnecessary to add another member to the staff or an entirely new course to the curriculum. This may also be true of dietetics. In many medical schools where clinic facilities are utilized for the teaching of medical students, the nutrition or food clinic has been integrated into such a program. In this case, the clinic dietitian is in an ideal situation, not only to teach the basic principles of dietetics, but she will be able to vitalize and motivate this teaching with demonstration teaching of the patients; and in addition, the medical student may be given an opportunity to teach the patient under the supervision of the dietitian.

In the hospital also, the therapeutic dietitian will be in a position to teach the medical student and intern something of the dietary problems involved in the diagnosis and treatment of individual patients.

And for the dietitian herself, a real advantage will be gained from working with a medical profession which is more fully aware of the importance and place of the principles and practice of dietetics.

NUTRITION AND DIETETICS IN MEDICAL PRACTICE

New therapeutic roles have been assigned to amino acids, protein hydrolysates, folic acid, and other vitamins. Likewise, new therapeutic diets have brought about improvements in various types of medical therapy.

As a result of these new discoveries, the practicing physician has both recommended and been requested to recommend "diet lists" to patients for innumerable purposes. As a consequence he has had to seek information from the most available sources. This has meant that commercial organizations, newspapers, and magazines, being the most accessible, have been the major sources of such diet lists. One pharmaceutical house alone has reported that 6 million reducing diets have been requested by practicing physicians in one year.

Since many of these offerings have been planned with varied motivations and purposes, all have not been equally well constructed from the standpoint of nutritional adequacy, therapeutic appropriateness, and acceptability to the patient. In fact, much of this dietary literature savors of food faddism and quackery, and many diets in use do not meet present day standards of dietary adequacy.

In order to make well planned diet lists available, a project was developed in the Diet Therapy Section of the American Dietetic Association to offer interested physicians the following services:

(a) An evaluation of diets in use at the present time.

(b) Preparation of reliable dietary material to meet the needs of those physicians who do not have available the services of a trained dietitian or nutritionist.

The committee[1] has taken preliminary steps to ascertain the interest of the medical profession and the availability of material which might be obtained from dietitians and nutritionists. It has been its aim to obtain diet lists that are attractive in form, simple, nutritionally adequate, within the budget of the average family, and as nearly appropriate as possible to the food habits within the region where they will be used.

While such diet lists will unquestionably be an improvement over much of the material which is now easily available, dietitians and nutritionist are fully aware of their inevitable limitations. The obvious rigidity and lack of individualization will leave much to be desired in regard to the particular individual's level of nutritive need; in regard for the patient's likes and dislikes in food; and in regard to local marketing facilities and costs, as well as other socio-economic needs.

Obviously, further appropriate interchanges and substitutions in foods will need to be made if such lists are to meet the ideal of flexibility or consideration for the individual patient. To meet this ideal, however, the physician will need a thorough knowledge of food composition, food preparation, and food habits. Such training in the basic principles of food and nutrition can most logically be given in the medical school, where dietitians are usually available who can both teach the medical student and give him supervised experience in the application of these principles of diet therapy.

In four recent editorials in the *Journal of the American Medical Association*, the Council on Foods and Nutrition calls attention to the importance and place of nutrition in the medical curriculum. It follows that if appropriate application of these principles is to be made, an equally important place should be given to the place of dietetics in the medical curriculum.

[1] Ruth Huenemann, chairman, University of Tennessee, Knoxville.

Army Announcements Concerning Personnel

Eva M. Johnson, R-2475, was promoted from Second Lt. to First Lt. during August, 1947.

The War Department has released the following official list of names of Medical Department Dietitians (not previously announced) who have been separated from service:

Captains

Shaffer, Camille J., R-1107, 3434 E. Baltimore St., Baltimore, Md.

First Lieutenants

Gervais, Barbara A., R-2392, 26 Playstead Rd., Newton, Mass.
Hollstein, Martha C., R-2441, 484 Milan Ave., Amherst, Ohio.
Iverson, Jean A., R-2274, 628 Ninth Ave., S., Grand Forks, N. Dak.
Stirratt, Mildred C., R-2407, 1925 Kent Rd., Duluth, Minn.
Thibeault, Leola E., R-1395, Summer St., Rockport, Mass.
Walsh, Kathleen B., R-2419, 52 Thompson St., New Bedford, Mass.

Second Lieutenants

Boyden, Virginia A., R-2481, c/o Lt. A. M., Pantone-M.G., Ft. Lawton, Seattle, Wash.
McIntosh, Lena, R-2510, Burlington, Wyo.

First Lt. Mary E. Stack, R-38, previously reported as separated from service, has been recalled to active duty.

Current Comment

EDUCATIONAL OPPORTUNITIES FOR THE DIETITIAN[1]

THELMA PORTER

Professor of Nutrition and Chairman, Department of Home Economics, University of Chicago

If we define education in its broadest sense, we will have to grant that *change* in itself is an educational opportunity if one is ready to take advantage of it. New persons with whom to work and play, new equipment and space in which to operate, and new points of view to accept or reject will add to your total store of experience and knowledge and will constitute one of your important opportunities as you leave your present training school.

Until modern times, the growth of education for women has been a slow and gradual development. During most of history, women were under the control of father, husband, or some other male relative, and their education was generally confined to training in the home for home activities. It is difficult for you, today, to realize that there were very few women graduating from professional schools prior to 1920.

Professional education creates a problem for both the institutions of higher learning in planning the curricula for women and for women themselves in defining their own concept of their place and function in American life. Any program of higher education for women must recognize that every woman is born into our particular society with certain sanctions and restrictions which create many of her personal and educational problems. It is a much more complicated affair than the education of men. Men from birth to old age are expected to prepare for and achieve vocational success in some particular field. The direction of a woman's life is much more unpredictable. The culture expects her eventually to marry and rear a family, thus setting marriage and parenthood for her as an ultimate goal of success in life except as this goal may be modified by career ambitions. The impossibility of predicting for the young woman whether she will marry immediately or not at all, whether she will need or choose to be self-supporting all or part of her life, or whether she will marry early and later be forced to earn the living for herself and dependents is a predominant complication in planning her higher education.

Because of changes in her own situation and because of changes in our society, the development and retention of flexibility in thought and action are major objectives in higher education for women. I believe that higher education should make life richer and more interesting for the individual not only while she is in school but in later life also.

The functions of dietitians and dietary departments—whether they are in hospitals, colleges, schools, welfare organizations, or commercial establishments—can best be grouped under three headings: administrative, educational, and scientific. Endeavors on the part of any dietitian for education beyond the point that you have reached today will have to be in line and support one or more of these areas of activity.

In the administrative aspects of the work of the dietitian, there seems to be almost no limit to the kinds of educational experience which might aid her. The administrative dietitian is required to handle money, is responsible for the use and care of valuable equipment, is directly concerned with the management of personnel, not to mention all of the other activities in which she engages. Additional training in the fundamentals of economics and sociology and in psychology would be of great value to her. Of course, you are all aware that the administrative positions are among the most lucrative in the field and that they are available in general only to those dietitians who have continued to educate themselves on the job or otherwise and have, therefore, merited such supervisory posts.

Without doubt, you are all aware that every dietitian *teaches* someone something, even in the course of the lower-rank jobs in a dietary department. An understanding of the fundamental principles in the learning process is essential to the most elementary responsibilities in this area of work. Further study in educational methods should be encouraged and made possible for dietitians, especially those employed for the instructing of interns, nurses, and patients. I have in mind the aspects of the problem not dealing with the subject matter itself, but rather the problems relating to proper

[1] Presented at the graduation exercises of the sixth class of dietetic interns at Veterans Administration Hospital, Hines, Illinois, on July 11, 1947.

"make milk a blessing in disguise!"

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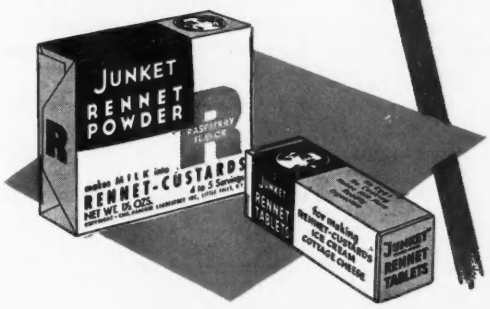

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interviewing techniques and the establishment of rapport between student and teacher. There is need for systematic study of appropriate methods. Should one lecture to interns? Should one demonstrate to interns? Is group-instruction of patients ever justified, or is it really better than individual instruction in some cases? These are questions to which we have only partial answers.

The most stimulating opportunities for further education, however, spring from the need for the solution of basic problems in the scientific aspects of the dietitian's work. No matter how high on the ladder of your profession you may climb, you will always find great subjective gratification in doing so because you knew the scientific principles underlying the applications you were making in your work. In fact I might even say that the height to which you climb will be determined in a large measure by the extent to which you are a "scientific" dietitian.

At this point I would like to mention briefly a few lines of research in nutrition which are holding much interest at present. These should keep those of us who are interested in further study in what I have chosen to call a "flexible" state.

Consider first the work going on in folic acid metabolism. The synthesis of this compound was announced just a little over a year ago, and folic acid, now called pteroylglutamic acid, was taken out of the category of "a less well-known B vitamin" and put in its proper place beside thiamine, riboflavin, niacin, and others. The story of folic acid began in 1935 when Day at the University of Arkansas reported an anti-anemia factor for monkeys, which he called "vitamin M." In the few years which have followed, Stokstad and Manning found that chicks required an additional factor for growth and named it "Factor U"; Hogan and Parrott of the University of Missouri found that chicks developed anemia as a result of the lack of what they called "vitamin B_c"; and Snell and Peterson of the University of Wisconsin discovered a factor necessary for the growth of *Lactobacillus casei*.

Investigators at the University of Texas had found a factor necessary for the growth of *S. Lactis R* which they called "folic acid" from the Latin *folium* meaning leaf, because it occured in leaves. When the "*L. casei factor*" had been synthesized and found to be identical with folic acid, it could be concluded that these two factors were one and the same. Now we can go still farther and call folic acid the "five-in-one vitamin" for Factor U, vitamin B_c *L. casei factor*, and probably vitamin M are all apparently identical, at least in many respects.

Further, the last six or eight years have witnessed a tremendous growth in our knowledge of the amino acid requirements of animals and of man. At the recent meetings of the Federation of American Societies for Experimental Biology not only were amino acid requirements of different species discussed, but the specific requirements of infants were brought to light. An infant requires about five times as much tryptophane per unit of body weight as does an adult. This is not so with isoleucine, however. The average infant formula apparently contains three times as much isoleucine as the youngster really needs. There are obviously many interesting problems to be worked out here.

Still another line of investigation that is engaging a number of laboratories deals with the importance of *interrelationships* among essential nutrients. The tryptophane level in the diet has been shown to affect the requirement of the rat for dietary niacin. The converse relationship also is true. Free tryptophane is more effective as a source of niacin than is a comparable level of tryptophane in casein. This tryptophane-sparing action of niacin may have marked economic significance in practical nutrition.

These three specific lines of research have been mentioned with the hope of arousing your interest in the possibilities of engaging in research, for such work can provide one of the most challenging of educational opportunities. Women have been accused of being essentially consumers of scientific knowledge rather than producers. I am trying to encourage the production of scientific knowledge by suggesting that in your future plans for educational activities you search for the opportunities to make some contribution, no matter how small, to our knowledge of nutrition and diet. Perhaps opportunities for investigations may be available in the very institution in which you will be continuing your work. If not, perhaps an affiliation between the organization in which you work and a nearby school would be possible. May you have a richer and fuller professional experience because you have tried to be a producer and not only a consumer of scientific facts, always evincing a flexible, dynamic attitude in your work.

ADVANCES IN PUBLIC HEALTH NUTRITION[1]

CATHERINE M. LEAMY

U. S. Children's Bureau, Federal Security Agency

Having been with the American Red Cross for a year and a half in Italy where food and education are scarce, my return to the public health field has brought a keen awareness of the changes and progress which have been made in the United States in the past few years. These changes, as I see them, will be discussed here.

First, nutrition does not seem to be as isolated a factor in public health as it was. The nutritionist has become an accepted part of the public health

[1] Presented at the 16th Annual Convention of the New York State Dietetic Association on May 22, 1947, at Lake Placid.

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team—a team which had its origin in the first state nutrition programs in the early twenties. Then, the nutritionist talked to mothers referred to her by the pediatricians in "well child conferences." She was part of the team which consisted of a pediatrician, a nurse, a dentist, a local physician, and six volunteers. Now, she is not only an accepted part of this team, but she also works closely with other members of the health department. Recently, a nutritionist stated that, in working on the food problems of institutions, she did not know where the problems of sanitation ended and those of nutrition began. In the rheumatic fever clinic the doctor, the nurse, and the social worker are all confronted with special nutrition problems which require not only their own knowledge of nutrition, but the consultation service of nutritionists daily.

Other professional workers are also becoming increasingly cognizant of the importance of normal nutrition for every child. The dentist is aware of a relationship between diet and dental health and uses the nutritionist to help make this phase of his program more effective. The health educator includes the nutritionist in her work shops for teachers, asks her for information for radio and newspaper releases, and considers her services in planning and executing projects considering the whole child. The nurse uses nutrition information and the services of a nutritionist so frequently, that nutritionists often think of nurses as their "right arms" of service. In all these situations, the nutritionist not only provides her co-workers with scientific information, but helps them to bridge the gap between science and practice with suggestions on how this knowledge can be translated to everyday living.

This teamwork approach is not confined to the members of the health department, however. Recently, a nutritionist reported a dental survey in which the home demonstration agent, the school nurse, the town dental health committee, the school lunch supervisor, and the school teachers all worked with the health department dentist and nutritionist. That was true public health teamwork in action!

A second indication of progress, together with the teamwork approach, has been an increased awareness of the place of nutrition in all phases of public health and the broadening of programs concerned with maternal and child health, as for example, the expansion of nutrition service in relation to state programs for crippled children. Not long ago, a nutritionist made a survey of the food habits of twenty children attending one clinic and found that only two had had an adequate breakfast! Here was a concrete indication of need for nutrition education. Another nutritionist reported that the nutritionists were beginning to receive referrals of children who were wearing braces with the request that they prevent large weight gains, rather than beginning nutrition instruction for the first time with those who were 20 or 30 lb. overweight.

Service is given in these programs in a variety of ways. Sometimes direct service is given at clinics; often the nutritionist participates in post clinic conferences of the clinic staff, in which the child's total needs are discussed and plans evolved for their solution. Frequently the nutritionist contributes to an institute for workers in this field. Occasionally family visits are made with the nurses for the double purpose of helping the family and helping the nurse. For example, Johnny, a youngster of eight, had rheumatic heart disease; his mother was bedridden with arthritis and since it was impossible to find a housekeeper, the problems of buying and preparing food for Johnny and his two little sisters fell on the older brother, a fifteen-year-old high school boy. When Johnny appeared at the clinic, the whole family were having trouble with constipation as a result of the diet the older boy was preparing. He realized that his ability to provide adequate meals for his family meant the difference between keeping the family together and having the youngsters placed in foster homes.

Not only are there services to be rendered to crippled children in clinics, but convalescent homes and foster homes furnish a medium for nutrition service which is a very important factor in the rehabilitation of children assigned to them for care. During a visit to one of these institutions recently, we saw a ward of thirteen children with rheumatic fever struggling over a dinner of riced beets, riced potatoes, large tough chunks of meat, milk, and a gelatin dessert. Not one child had eaten even a quarter of the meal, yet for these children, adequate food was of major importance to recovery.

Many foster mothers who provide homes for children need help in meeting the nutrition needs of the children for whom they are caring. Sometimes this service can be given directly to small groups of mothers. Often it can be given through strengthening the nutrition information of the nurse or social worker who is in close contact with them.

Service to convalescent homes is an example of an expanded service to institutions. In several states, the department of welfare has become increasingly aware of the feeding problems in the institutions under its jurisdiction, and has called on the nutritionists in the health departments for assistance in surveying the present status of food service in these institutions and in making concrete recommendations for improvement. In a large state like New York, however, this responsibility would logically be assumed by the Department of Welfare rather than by the Department of Health.

Service of this type, often involves visiting institutions over a period of time to give consultation. For example, in one children's institution a typical supper menu of pea soup and dry bread was transformed

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Director, Home Economics Department
Kellogg Company
Battle Creek, Michigan

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over a period of time to a typical menu of macaroni and cheese, green salad, bread and butter, fruit, and cookies. As a result of the nutritionist's service, in one state dried milk was made available to all state institutions with instructions as to its use.

Another evidence of this type of growth is found in the growing practice of placing the responsibility for hospital licensing under state departments of health. In the typical questionaire used by licensing boards much information is requested about kitchen sanitation, but little has been included about the type of food served the patient. In enlisting the aid of the nutritionist, the staff is asking not only for assistance in working out ways of obtaining the necessary information to establish minimum standards for food service, but also for consultation service where there is a need. In one state, nutritionists, on request, visit hospitals which do not have a trained resident dietitian. They also sponsor a news letter to hospitals which emphasizes material related to food service as reported by the licensing staff.

This same type of service to institutions is being extended to tuberculosis sanatoria where dietitians are not employed. Those concerned with tuberculous patients are also becoming aware of the nutrition problems of patients within and without the sanatoria. There is an interest in using the sanatorium situation as a medium to teach the patient the place of diet in his health regime and its importance to his health after leaving.

Emphasis is also being placed on nutrition education in tuberculosis clinics. Nutritionists are working with health education specialists to prepare material for use with these clinic patients. They are also working with nurses, giving them information which will assist them in helping the patients to meet their nutritional needs in their homes.

This increased demand for nutrition service has not been confined to requests of members of health departments. Many state departments of welfare are not only facing nutritional problems of institutions under their jurisdiction, but are becoming acutely aware that the food budgets used by their agencies need to reflect scientific food standards for a "minimum adequate diet." In several states the nutritionists in the state health department have been instrumental in developing these standards and are demonstrating to the welfare departments the value of employing a home economist who has had advanced training and experience in the field of social welfare. Private agencies, such as local visiting nurse associations, are also using the services of the nutritionist both in their in-service training programs and as a consultant.

I am sure that everyone who has worked with the professional personnel both of health departments and of other agencies, such as departments of education, has wished that more nutrition could be included in the basic training of her co-workers. Here again, there is a marked increase in demand for nutrition service in training schools. In one state, where teachers' workshops in health education had been held with the nutritionists participating, the teachers' group appreciated their lack of basic knowledge on which to build the wise use of nutrition consultation service. The result was a request from a teacher training institution for help in incorporating nutrition information in its curriculum.

In another state, nurses have expressed the belief that the nutrition instruction which they received in their basic training was not practical. As a consequence, the nutritionist from the state health department has met with the dietitians who give the training and together they have adapted to the needs of that state the material for teaching nurses which has been prepared by the American Dietetic Association. This includes the public health aspects of nutrition which will be used by the nurse entering the public health field.

This training in nutrition, both of the student and of the professional worker, is not necessarily an isolated unit, however. It is most encouraging to realize that the nutritional aspects of an individual problem are included as part of the whole, particularly in the in-service training by our health department colleagues. For instance, instead of isolating the nutrition of the pregnant woman, nutrition is now integrated into the discussion of her total regime. The same is true in the field of child growth and development. Nutrition is included in its proper perspective.

Another type of activity which reflects the teamwork approach is that of the wider use of the nutrition surveys. To effectively assemble and use the material, these surveys require the cooperation of the nutritionist, the physician, laboratory workers, nurses, the health educator, and the community. The nutritionist not only plays an important part in collecting the information, but is an equally important medium in transferring the findings into action which will culminate in a community program of action. The findings of these surveys should prove of inestimable value to the community involved and should interest other communities in developing practical long term nutrition programs in relation to their own community needs.

In discussing the developments of teamwork in the state health department nutrition services, I have purposely left until last, work with maternal and child health services. Since this type of service is the oldest in which nutritionists have functioned and probably the one with which you are most familiar, I shall mention it only briefly. One of our very early examples in teamwork in nutrition service was found in the "well child conferences"; others can now be found in prenatal clinics, mothers' classes, preschool dental programs, and public health nursing supervision of

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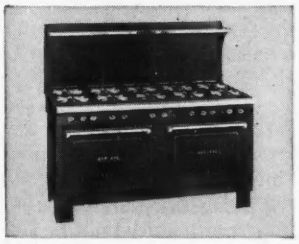

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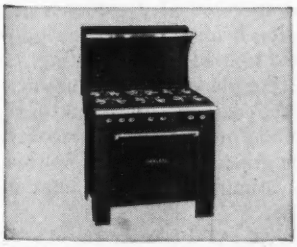

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the preschool child. Before the passage of the Social Security Act in 1936 there were but three states which had a nutrition service. At that time, the State and Territorial Health Officers Association recommended that one medium for strengthening maternal and child health services in the states was to develop nutrition services within the maternal and child health division of the state health departments. We now have forty-eight governmental units where nutrition service has been developed. This has been accomplished in slightly more than a decade.

This growth in public health nutrition service is not confined to official public health agencies, however. Voluntary agencies, such as the American Red Cross, visiting nurse associations, and family service societies, were among the first to demonstrate the value of public health nutrition, and growth in this field has paralleled that found in official agencies.

A third sign of progress in the field of public health nutrition can be found in the training of its workers. For many years, schools of home economics offered graduate courses for those interested in public health nutrition, but only recently have these graduate programs been designed especially for public health workers. In New York state there are three such programs available. Both Teachers College, Columbia University, and Syracuse University have such programs. Another is being developed at Cornell University. Such programs offer courses not only in the school of home economics, but also in the schools of nursing, social work, medicine, and public health. Thus a student becomes a part of the public health team in her training as well as when she is on the job. In addition to courses in public health nutrition, these programs offer the valuable adjunct of field experience under the supervision of well qualified workers. Here again, the student sees teamwork in action and receives further preparation for her place in the public health team when her training is completed. Additional evidence of teamwork is found in the excellent cooperation between graduate schools and the public and private agencies where field work is provided.

METHODS OF EMPLOYEE EDUCATION IN SANITATION[1]

JOSEPH H. DRAYER, D.V.M.

Chief, Division of Food and Sanitation, Department of Health, Columbus, Ohio

Today as never before we are faced with the problem of sanitation in food establishments. It is unthinkable, but the fact remains that in the industry of feeding great masses of people we have delegated sanitation to untrained workers. Where would surgery be today if asepsis and antisepsis were ignored as they are in many food establishments?

We have no idea how many cases of food poisoning occur every day, for if a group of people eat a meal in a restaurant and go their respective ways, it is unlikely that we will ever know if any or all of them become ill. It is only, as a rule, when a group eat and stay together for several hours that we learn of a food poisoning outbreak.

Likewise, we have no statistics telling how many respiratory and intestinal diseases are transmitted in food establishments, but we do know that about 40 per cent of all communicable disease *can* be transmitted in this way.

We have many aids to sanitation in food establishments but we must know how to use them correctly if they are to be effective. What good is a dishwashing machine if the proper temperature for the wash and rinse water is not maintained, if the jets are allowed to become clogged, if the proper amount of washing compound is not used, or if the machine is never cleaned? What good is a refrigerator, if food is allowed to stand at room temperature?

We cannot expect the workers in any food establishment to follow the rules of sanitation unless they know why they are necessary. It is to answer the question "Why?" that food handlers' schools are needed. These may be given by either the public health department or by the restaurant or food establishment itself. Food handlers' schools that are given by public health departments must be organized somewhat differently than those given by restaurants, schools, institutions, and industrial plants, for the public health department must first plan to interest the owners and operators of food establishments in the program. This is not necessary when the industry itself can demand the attendance of the workers. However, the subject matter and the general plan for instruction need not be very different.

We have found that forty to fifty students at a time give the best results; if more than seventy-five are in one class it is hard to hold their attention. If possible, a regular meeting place should be obtained and always used for the sessions, for some of the students may become confused if the classroom is changed. A door prize given to each class finishing the course frequently stimulates interest and increases attendance, also.

The number of sessions can be from two to six. In our department it was decided to hold three, 1½-hr., weekly classes. In institutions or industrial plants, these may be given on successive days. The time selected for our meetings was 3 and 8 p.m. as these were the hours most suitable for the workers.

The first session we built around the sound-slide films titled "Our Health in Your Hands," and "Germs Take Pot Luck." At the second meeting

[1] Presented at the Annual Meeting of the Ohio Dietetic Association on April 25, 1947, in Dayton.

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"Service with a Smile" and "In Hot Water" were shown, and for the final session, the movie was "Safe Food for Good Health." These films were produced by the U. S. Public Health Service and can be purchased from Castle Films, Inc.

A school can be established with the use of these films alone, but if possible a movie at each session should be supplemented by other teaching devices. Numerous other films are available and are listed in the *Guide to Safe Food Service*. This manual, published by the U. S. Public Health Service, was prepared to serve as an aid in organizing and conducting classes for food establishment employees and can be obtained from the National Sanitation Foundation at the University of Michigan, or from the Government Printing Office in Washington, D. C.

A demonstration of some sort should be used at each class. At the first session it is suggested that three Petri dishes containing sterile agar be used. Explain, and if possible, demonstrate how the plates were free from all bacteria. Have one student place his fingers on the medium. Have someone cough into the second plate, and in the third plate place a hair from a student's head. Incubate these plates and show them at the next session. At the second session, a demonstration can be given to show how dishes and utensils are swabbed to obtain the bacterial count. Again, if possible, have the material and equipment on hand to prepare plates which will be incubated and then shown at the last session. These demonstrations are of great value for they give the trainees an inside view of the technical workings of the inspection service, and they again show them the "why." Class demonstrations such as these effectively impress facts on the students' minds. Next in effective teaching techniques come visual aids, such as slides and movies.

In planning such courses, the question of how technical the talks can be must be decided. In considering the problem, remember that in a group of food handlers there may be illiterates and college graduates. The lectures should not be so technical that the majority of the class cannot understand them, and yet the basic facts of sanitation must be effectively covered. For example, it may be better to speak of "germs" rather than "bacteria."

If there is time, a period for questions and discussion may be incorporated in the agenda of the classes, for it serves to bring about a closer association between the teacher and the students. This rapport is important. Another aid to this end may be a story or a joke that has some bearing on the subject matter.

Anything of the moment that has bearing on food sanitation should be brought up and discussed. For example, a recent issue of a widely-read weekly magazine told of a woman who was a typhoid carrier and helped to prepare a wedding dinner for more than two hundred people. This resulted in twenty-two cases of typhoid fever with one death. This could be read, pointing out the importance of transmission of disease by food handlers and the care that should be taken in washing the hands properly after leaving the toilet, because other diseases may also be transmitted in this same manner.

Try to show the trainees that their work is important—that it is as important, if not more so, than any other job in the community. Build up their morale and tell them that theirs is an honorable and exacting occupation. If this is taught well, when they finish the course, they should feel that they are the buffers between the public and disease.

The first session should be planned to point up the importance of sanitation in food establishments and the great responsibility of food handlers in regard to public health. The class should be told how nothing really was known of the cause of disease until the time of Pasteur and how he and other scientists, by use of the microscope, discovered that bacteria, or germs, caused disease. Explain that bacteria are actually living things and that some are harmful and cause disease, while others are quite harmless and even helpful. Next, describe bacteria, their size, what they look like, that they require food and moisture and the proper temperature, and how they reproduce. Explain that disease can be transmitted through direct contact, through food and utensils, and what a carrier is. Name some of the communicable diseases transmitted in food establishments and how they are transmitted. Food poisoning should be explained, with a discussion of the different kinds, the causes, the symptoms, and how to prevent each type. If any food poisoning outbreak has occurred recently, it can be used as an example. At this point, give your demonstration with the sterile media in the Petri dishes. The last topic of this session should cover flies, roaches, rats, and the danger of these pests in food establishments, how they transmit disease, and the eradication and control of them.

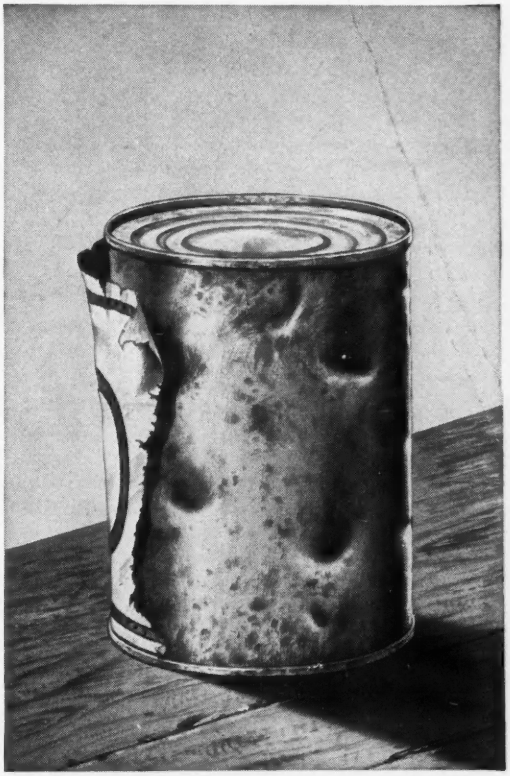
We have always finished each session with a true and false questionnaire. The following is an example of the one given at the end of the first session.

	TRUE	FALSE
1. Bacteria are single-celled living organisms.	____	____
2. Bacteria are too small to be seen with the naked eye and are measured in microns (one twenty-five thousandths of an inch).	____	____
3. Some bacteria reproduce every 20 min. under favorable conditions.	____	____
4. Those bacteria which cause disease are known as pathogenic.	____	____
5. Bacteria do not need food, moisture, or a favorable place to grow.	____	____
6. High temperatures and certain chemicals kill bacteria.	____	____
7. The tuberculosis germ is the only real cause of tuberculosis.	____	____
8. The U. S. Public Health Service Bulletin lists sixty-two communicable diseases,		

DEAD AND NOT-SO-DEAD FALLACIES

In Siam years ago, after the birth of a first child, the mother alternately exposed her back and abdomen to a near-by fire for thirty days.

It was believed that this torture appeased the gods and prevented the most direful consequences to both mother and child.



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of which 25, or 40 per cent, may be transmitted by food and eating utensils. ____ ____

9. Intestinal diseases are often spread by carriers. ____ ____

10. Common towels and drinking cups are not dangerous. ____ ____

11. Thorough washing of the hands with soap and water is necessary after each visit to the toilet. ____ ____

12. There is danger in leaving foods exposed on the counter. ____ ____

13. Communicable disease cannot be transmitted from one person to another. ____ ____

14. Exposure to the spray from the nose and mouth of persons when coughing and sneezing is not dangerous. ____ ____

15. The chief business of any food establishment is to see that the foods are properly and safely prepared and served. ____ ____

16. It is possible, by strictly following sanitary methods, to assist materially in preventing the spread of communicable disease. ____ ____

17. Rats may spread disease to human beings. ____ ____

18. The house fly is sometimes called the typhoid fly because it has been found to spread so much typhoid fever. ____ ____

19. Roaches have no odor and do not spread disease. ____ ____

In the second session, after showing the results of the incubated plates, the first topic should deal with the health and hygiene habits of food handlers, showing the students why their bodies should be clean. Clothing and shoes should be clean, in good repair, and fit properly. It should be explained that if the worker were in ill health or were fatigued, his resistance to disease would be low, that he could easily contract disease which in turn could be transmitted to others either directly or by food or utensils. The necessity for washing the hands after leaving the toilet and handling contaminated food or utensils should be explained. A demonstration should be given on how to store and handle dishes and utensils after they are washed. At this point the demonstration of swabbing dishes for a bacterial count can be given.

In the last part of this session dishwashing can be discussed. Such a lecture should start with the proper way to clear tables and include the steps of scraping, prerinsing, washing, and sanitizing by both the hand and machine methods. Special emphasis should be given to the importance of this phase of food sanitation and the real value of an operator who knows and does a good job. In this connection it might be possible to call these workers "dish machine operators" or "dishroom attendants" and thus get away from the stigma of "dishwashers" or "pearl divers." Their job is so important that they deserve special consideration and training. The old method of employing anyone as a dishwasher does not fit in modern food sanitation.

The true and false statements for this session are:

	TRUE	FALSE
1. Personal cleanliness is not important as far as food handlers are concerned.	____	____
2. Food handlers can prevent the spread of disease in their handling of food and eating utensils.	____	____
3. Particular attention should be paid to cleanliness of hands and fingernails.	____	____
4. Fingers should always be looked upon as transmitters of disease.	____	____
5. After glasses, cups, and eating utensils are once sterilized, it doesn't matter where or how they are stored.	____	____
6. Infections may be transmitted from patrons to food handlers by careless handling of used napkins and dishes left by the patron.	____	____
7. A towel used to wipe tables, counters, and so on, should not be used to wipe serving dishes.	____	____
8. Responsibility for preventing spread of disease doesn't rest with food handlers.	____	____
9. It is very important to wash hands and arms thoroughly after using the toilet.	____	____
10. A sanitary establishment is necessary to protect the public health.	____	____
11. Food can be contaminated by an employee who is a carrier of disease.	____	____
12. The most common types of food poisonings today are due to harmful bacteria in our foods.	____	____
13. Uncovered food may be contaminated by people talking over it.	____	____
14. Serving food free from bacterial contamination should be the chief aim of every food handler.	____	____
15. It is easy to transmit bacteria from the mouth to cooking utensils.	____	____
16. A cold rinse is sufficient to remove all bacteria from contaminated cooking utensils.	____	____
17. It is quite possible to transmit infections of certain respiratory diseases, such as colds, sore throats, influenza, and pneumonia, through improperly sanitized eating and drinking utensils.	____	____

In the third and last session the results of the swab test can be shown. Then discussion can center around how food is protected before it reaches the food establishment. The steps of inspection of meat, milk, marine foods, canned foods, dried foods, baked foods, fresh fruits, and vegetables can be described. This talk should demonstrate to the class that if food is purchased from a reliable source, it has had ample protection and that they, the food handlers, should observe all the rules of sanitation to keep it that way. The importance of keeping food hot or properly refrigerated and covered at all times should be told to the trainees in such a manner that they will always remember it. A summary of the three sessions should then be given.

The quiz for the last session is as follows:

	TRUE	FALSE
1. Serving food free from bacterial contamination should be the chief aim of every food handler.	____	____

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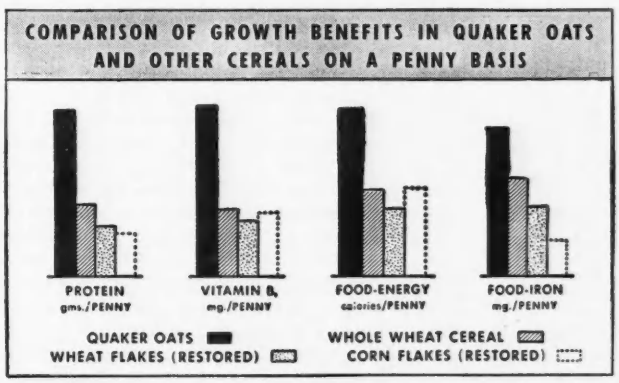

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2. It is easy to transmit bacteria from the mouth to the eating utensils. ____ ____
3. A cold rinse is sufficient to remove all bacteria from contaminated eating utensils. ____ ____
4. It is quite possible to start epidemics of certain respiratory diseases, such as colds, sore throats, influenza, and pneumonia, through improperly sanitized dishes. ____ ____
5. Reserve supplies of single service utensils should be available in all eating establishments to care for peak customer loads. ____ ____
6. There is no state law with reference to the sterilization of eating utensils in public food dispensaries. ____ ____
7. Proper sanitization of dishes involves washing, rinsing, and immersion for 2 min. in water heated to 170° F. ____ ____
8. If sterilizing water is 170° F., dishes should be immersed for 10 min. ____ ____
9. It is not necessary to protect dishes in storage after they are sanitized. ____ ____
10. Sanitized glasses and cups should be placed upright when set upon the shelf. ____ ____
11. Silverware should be placed in storage so that only the handle is grasped when removing it for service. ____ ____

A certificate of attendance is given to those who have attended all three sessions.

Although we must stress some phase of sanitation more than another, such as dishwashing, we must not, at the same time, play down the importance of other sanitary needs. If one part of food sanitation is not observed, it breaks a link in the chain, the whole program is disrupted, and we have lost the final objective—protection of public health.

World Food Situation Reviewed

A report prepared by the Food and Agriculture Organization for use at the third annual session of the Conference of FAO held in Geneva in August summarizes the world situation and outlook for food and agriculture. In this report, titled *The State of Food and Agriculture: 1947*, it is pointed out that even to hold the present line of food supplies and other agricultural products, will require drastic action.

In 1946–47, it is stated that 28 million tons of grain were imported into deficit areas, but for 1947–48, minimum import needs for Europe, North Africa, and Asia may be estimated at 34 to 38 million tons, without allowing for any improvement in bread rations, any additional livestock feeding, or any increase in working reserves. In contrast to this estimated need, supplies which will be available for export have been calculated at only 30 to 34 million tons. Diets in Western and Central Europe will be lower next year, and in Asia they will remain at present very low levels, unless imports can be increased. Unless imports to Asia can be raised, there seems little or no prospect of improvement over the level of 1700–2000 calories which prevailed this year. In Western and Central Europe, indigenous food supplies are expected to be considerably smaller than in 1946–47, and the already low caloric level may fall another 5 to 10 per cent unless food imports can be increased.

It is pointed out that restoration of food output to prewar levels is not enough to meet the demand, for the world population is increasing by 15 to 20 million persons each year, and consumer demand for food is higher everywhere than before the war. In some regions formerly regarded as food surplus areas, growth in industrialization has caused increases or changes in domestic food consumption and a reduction, in some cases perhaps a permanent reduction, in food exports. There is also the increased public awareness of the importance of improved diets and the obligation increasingly acknowledged by governments not merely that hunger must be prevented but that diets adequate in quantity and quality must be brought within the reach of all classes.

Thus nations must plan not only to surmount the present emergency situation, but permanently to increase levels of food output. In meeting this problem, the potential areas of Latin America and Africa are mentioned, for both continents are sparsely populated with great undeveloped or partially developed land resources, and both could produce food far in excess of their own needs. However, the possibilities are as yet unexplored and uncomprehended.

The weak link, in planning to meet the overwhelming need for greater production, both now and in the future, is the fear of surpluses. The fear is that shortage of foreign exchange will reduce demand for imports, that demand will shrink when rehabilitation needs have been met, or that synthetics will displace many farm products. Any international programs for full production must include some assurance of expanding markets and reasonable prices if governments, business, and farmers can be expected to cooperate in carrying them out.

In order to take steps to direct the situation wisely, three recommendations were made for the FAO Conference to consider:

(a) That better sources of information be provided by governments to FAO in regular communication of statistics and in periodic reports.

(b) That reliable analyses of the available facts be made by FAO.

(c) That a forum, or Council, in which governments can discuss the evidence and decide on action be formed. This Council would be known as the World Food Council and would examine the changing situation at intervals between the annual reviews of FAO and advise governments about needed adjustments.

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Book Reviews

Parent's Questions. Rev. ed. By the Staff of the Child Study Association of America. New York: Harper and Brothers, 1947. Cloth. Pp. 256. Price $3.

How do you train a child to eat everything that is put before him? How do you enforce the rule of "forbidden sweets" for an overweight child? How do you encourage the underweight child to eat more? What should be said concerning breast vs. bottle feeding and concerning rigid feeding schedules? These are examples of some of the everyday questions concerning food which have been answered in the revised edition of this popular, up-to-date handbook, which appeared originally in 1936.

As stressed by the authors: "The best health insurance for the next generation is parents who understand the medical and nutritional requirements for healthy growth but who do not stop there. They must be able to see that these medical and nutritional needs are met with balanced judgment, with good humor, and good sense and without conveying anxiety to the child."

In the 1947 edition a new chapter has been added, and the questions have been revised to meet the needs of today's parents. Each chapter begins with a brief statement of general principles and is followed by questions and answers applicable to familiar home situations. In addition, case studies are included which illustrate the principles further. In this way, a fuller appreciation is given of the kind of day-by-day problems which arise and of the rate of progress which may be expected. The case study of Nancy, an underweight child of six and one-half years of age, is one which will have particular merit for the dietitian who must help the mother who has difficulty in following the recommendations for a high caloric diet.

While the questions on feeding behavior will be of primary interest, the entire book should be given close scrutiny and consideration, for discussions are included which point out the many factors which influence feeding behavior. Only with a picture of the total problems of the child can sufficient perspective be gained for appropriate food therapy. Although this book has been prepared for parents, it will be of inestimable value to the dietitian and nutritionist who share the responsibility for understanding and handling these situations properly.

The 1946 Year Book of Endocrinology, Metabolism and Nutrition. Endocrinology edited by Willard O. Thompson, M.D. Metabolism and Nutrition edited by Tom D. Spies, M.D. Chicago: The Year Book Publishers, Inc., 1947. Cloth. Pp. 573. Price: $3.75.

New advances and new refinements which have been made during 1946 in both diagnosis and treatment have been collected from current literature and presented in a readily assimilable, enjoyable style.

This volume is one of the thirteen comprising the Practical Medicine Series of Year Books, founded in 1900 by G. P. Head, M.D., and C. J. Head, and published continuously since then. For the past twelve years the section on Endocrinology has been published in the Year Book of Neurology, Psychiatry and Endocrinology. This is the first year that it appears as the Year Book of Endocrinology, Metabolism and Nutrition.

According to Willard O. Thompson, the most significant reports in endocrinology have been those presenting more precise information on thiouracil and related substances, notably propylthiouracil; further reports on the use of radioactive iodine in the treatment of toxic goiter; and reports on substances closely related to desoxycorticosterone, but having different effects on electrolyte and sugar metabolism.

The newer findings of metabolism and nutrition have been reported as they relate to: the pancreas, liver, and adrenals; the alimentary tract, the hemopoietic system, and the cardiovascular system; the brain and nervous system; the reproductive system; the dermal, muscular, and skeletal systems; nutrition, infection, and immunity; malnutrition; and therapy.

Recipe Book. 4th ed. Compiled by the Women's City Club of Detroit. Detroit: Women's City Club, 1947. Paper with plastic cover shields. Pp. 309. Price: $3.

Indicative of good living are the recipes found in this fourth edition of the *Recipe Book*. It is a book this reviewer would like to own. The recipes have been collected from many individuals, some whose names are known in social as well as in professional groups. It is evident that the contributors have given some of their best and most outstanding recipes. Economy is not a feature of the recipes, but to those persons looking for something "different" for their guest dinners, there are many dishes they will want to try. Not all of the recipes are unusual, but the seasonings used in many of them are such as to lend distinction to the food and to suggest that the majority of contributors are true gourmets.

In general the book is divided into three main parts. The main body contains approximately nine hundred recipes suitable in size for family use. Preceding this main part is a feature of fourteen pages called the "Bride's Corner." Here are suggestions for Breakfast, Luncheon, and Dinner Menus, together with the correct assignment of flat silver and china for each meal. There is also a limited number of recipes for two, as well as Food Hints, Menu Terms, Cookery Terms, and so on.

The third part of the book contains sixteen pages of recipes for "Quantity Cooking." These recipes are not organized according to any particular plan or method of grouping, nor are they standardized for any basic given amounts, since they vary from ten to approximately one hundred portions per recipe. The recipes are not particularly unusual although they are good ones. Perhaps they would be more useful to organizations rather than to institutional food service units.

Other features of the book include charts on weight and measurement and equivalents as well as "Quantities of Vegetables to Purchase for Four Servings," "Household Hints," and "Cooking Discoveries." These last two

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are interesting, if not scientific, and help to supply the atmosphere of a practicable cook book.

The book is simply compiled with no comment concerning any part of it and with no illustrations. The recipes seem accurate, although in one or two instances some one ingredient has been omitted in the printing. Directions are concise and adequate and the book is well indexed. The washable plastic leaves covering the book make it serviceable and attractive.—*Una Vermillion, Utah State Agricultural College, Logan, Utah.*

Skin Diseases Nutrition and Metabolism. By Erich Urbach, M.D. New York: Grune and Stratton, 1946. Cloth. Pp. 634. Price $10.

This is an interesting compilation of the available biochemical and clinical material relating to lesions of the skin and to a great deal else. The author introduces his material in terms of three major theses: first, that the metabolism of the skin is closely related to the diet; second, that these metabolic processes are significantly related to dermatoses; and third, that the skin cannot be satisfactorily studied by analyses of the blood. He has contributed not only the suggestion but a technique of electric punch biopsy of the skin and microanalyses for some mineral elements.

Much more analytical work, however, needs to be done to give a sound basis for the suggested relationships between specific diets, the composition of the skin, and individual skin diseases. The diets studied need greater standardization and control of variables. This would seem to be particularly required for those factors which appear related to the distribution and storage of water and of minerals. Diets described by different investigators as acidifying, alkalizing, or low-salt contain many possibly significant variables in addition to their potential metabolic excess of acid or alkali or lack of sodium chloride. Few experiments are offered as evidence of the relation of diet to the skin where the variables are actually limited and the diets nutritively adequate in other respects.

This book would be a greater contribution if there were greater emphasis on diet therapy of only those diseases where experimental evidence is available and if that evidence were presented. It seems unnecessary to include so much experimentally unsupported clinical data unless they are presented as opportunities for research to determine the fundamental relationships suggested by the clinical clues.

In handling this book, one is impressed with the excellence of the paper due possibly to the fact that its 643 pages contain 266 photographic illustrations. These illustrations are clear cut and informative, but a reduction in their number with the substitution of a few equally excellent illustrations in color would be an improvement. The bibliography is extensive and includes many references in foreign journals which may not before have been called to the attention of American physicians and dietitians.—*Margaret H. Brookes, Ph.D., assistant professor, Home Economics Department, University of Chicago.*

School Health Problems. By Laurence B. Chenoweth, M.D. and Theodore K. Selkirk, M.D. Rev. (3rd) ed. New York: F. S. Crofts and Company, 1947. Cloth. Pp. 419. Price $4.

This is the third edition and ninth printing of this text. The purpose of the book is to acquaint students of education, teachers in service, and others with the broad general nature of health problems in schools. The authors have combined their practical experiences as health workers with a survey of medical and educational literature. Dr. Richard Arthur Bolt has contributed an outline of school health administration. The plan of the first presentation has been followed in this edition, with new methods and techniques being included. There is additional information concerning the nutritional deficiencies and their effects on children. The authors do not consider the book as a comprehensive study of all phases of school health but rather as an outline of the common practices in schools. At the end of each chapter, references are appended for further study and clarification.

Two of the nineteen chapters are devoted to nutrition, and the importance of nutrition is stressed in many of the other chapters. The section on vitamins could be revised and elaborated upon to some extent. The dietitian, nutritionist, or cafeteria manager who is connected with a school will find the book interesting and will obtain a good picture of the complexities of the entire program. It is noted that there is no mention in the book about the contributions which are made to the school health program by dietitians, nutritionists, or cafeteria managers.—*Martha Trulson, Veterans Administration, Chicago.*

A Bibliography on Dietetic Careers

Just off the press is a new booklet, *A Bibliography of Dietetic Careers*, which has been prepared by the American Dietetic Association to serve as an aid in interesting girls in dietetics. In it are approximately 175 listings of magazine and journal articles, books, and pamphlets all of which deal with the occupational aspects of dietetics.

Organized according to the various fields of opportunity for the dietitian, sections are included on "Careers in Dietetics," "The Training of Dietitians," "The Dietitian in the Hospital," "The Dietitian in Government Service," "The Dietitian in a Food Clinic," "The Dietitian in Public Health Work," "The Dietitian in the School Lunchroom," "The Dietitian in Colleges and Universities," "The Dietitian in Industry," and "The Dietitian in Business."

With few exceptions, only references published within the last five or six years have been listed, so that information obtained from them will be accurate and up to date. Such a reference list should be extremely helpful in counseling and talking to girls who are considering dietetics as a career, for it will suggest readings to which such girls may refer for an accurate picture of the dietitian's work.

Attractively printed with a two-color cover in green and black, single copies of this *Bibliography* are available free of charge on request to the American Dietetic Association.

In 1799 . . . Napoleon's soldiers, while digging trenches near the mouth of the Nile, unearthed this strange "Rosetta" stone. The inscription was written in three different sets of characters—Greek, Egyptian, and an unknown third language. From this "key" scholars were able to decipher the strange inscription and thus discovered the meanings of ancient Egyptian writings.

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Current Literature

Contributed by Janette C. Carlsen and Ethel M. Miller, Dietary Department, The Johns Hopkins Hospital; Lorraine G. Weng and Marian T. Straube, University of Chicago Clinics; and the Journal staff.

THE AMERICAN JOURNAL OF DIGESTIVE DISEASES

Vol. 14, June, 1947

* An evaluation of the antacid activity of protein hydrolysate using graduated doses in the human stomach. A. X. Rossien.—p. 205.

Antacid Activity of Protein Hydrolysate. Protein hydrolysate has been used in the treatment of chronic peptic ulcer with considerable success. The amphoteric character of the hydrolysate enables it to have an antacid effect on gastric acidity. This study was conducted to determine the duration of antacid effects of graduated doses of protein hydrolysate. With doses varying from 15 to 50 gm., it was observed that the best antacid effect was at 1 hr. The best results were obtained on patients receiving 30 or 45 gm. of the hydrolysate. These tests showed that although the protein hydrolysate has an antacid effect, it nevertheless should be supplemented with another antacid at the end of 1 hr. There is apparently a tendency for it to become a stimulator for the secretion of free hydrochloric acid in the stomach at the end of 1 hr., or at least when its antacid activity has been spent.

THE AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 149, June, 1947

* Sodium, potassium and phosphates in the cells and serum of blood in diabetic acidosis. T. S. Danowski, P. M. Hald, and J. P. Peters.—p. 667.

Sodium, Potassium, and Phosphorus in Blood. This investigation was made to verify the work previously done on diabetic acidosis and to study further the mechanisms which control the motions of phosphate. Blood was drawn from diabetic patients admitted to the hospital in a state of acidosis and analyzed for sodium, potassium, total acid soluble phosphate, inorganic phosphate, and water. It was confirmed that at the height of diabetic acidosis the blood cells are extremely depleted of phosphates and base. These components are slowly restored during recovery. The discussion of results includes explanations for the changing distributions of phosphates and base during diabetic acidosis.

AMERICAN JOURNAL OF SURGERY

Vol. 74, July, 1947

* Cholecystitis and cholelithiasis in the young. E. C. Heringman and D. W. Aiken.—p. 27.

Cholecystitis and Cholelithiasis in the Young. The incidence of acquired gall bladder disease in young individuals is low, but not as low as previously believed. The twelve cases of the disease which are reported occurred during one of the following periods: (a) The neonatal period and very early childhood when congenital lesions of the biliary system are present. (b) Late childhood when cholecystitis with or without cholelithiasis occurs. Such a patient usually has a history of an infectious disease, and in this group the condition usually subsides. (c) The period following puberty when the disease closely resembles that which occurs in older patients. Adult factors, such as pregnancy, played an important role in the development of gall bladder disease in the group studied, despite the fact that the patients were under twenty years of age.

ANALYTICAL CHEMISTRY

Vol. 19, July, 1947

Determination of alpha-amino nitrogen as ammonia. F. S. Schlenker—p 471.

Determination of flavanones in citrus fruits. W. B. Davis.—p. 476.

Flavanones in Citrus Fruits. A new colorimetric method for estimating naringin and other flavanones that may be present in citrus fruits is described. In applying the method, determinations were made of the distribution of naringin and hesperidin in the tissues of grapefruit, Valencia orange, lemon, and tangerine. In one experiment centrifuged juice came in contact with macerated section membranes for 1 min., doubling the concentration of naringin in the juice. This evidence that the juice quickly extracts naringin from section membranes indicates the possibility of using the method to correlate differences in the bitterness of juice with the method of its extraction and with the condition of the fruit.

CANADIAN JOURNAL OF PUBLIC HEALTH

Vol. 38, June, 1947

* The retention of ascorbic acid in canned fruit juices and tomatoes during storage after opening. H. D. Branion and C. R. Cameron.—p. 238.

Ascorbic Acid in Canned Fruit Juices and Tomatoes. During the war apple juice in Canada was fortified with ascorbic acid since citrus fruit was not being imported and no other good source of ascorbic acid was available. Tests proved the loss of ascorbic acid from apple juice to be greater than from tomato juice, tomatoes, or grapefruit juice during storage in opened containers, either at room temperature or in a refrigerator. In almost all cases the loss was less from products stored in refrigerators than at room temperature. The difference of loss cannot be attributed to variations of *pH* since the change in *pH* was insignificant during the course of the experiment.

GERIATRICS

Vol. 2, July-August, 1947

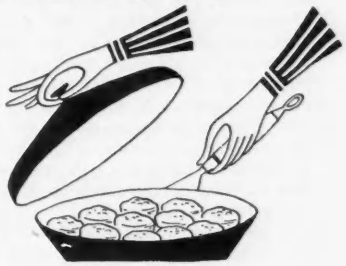
* Nutrition in cardio-vascular disease. D. C. Peete.—p. 213.

try these with NUCOA!

NO-OVEN BISCUITS

2 cups sifted flour
2½ teaspoons double-action baking powder
½ teaspoon salt
4 tablespoons Nucoa Margarine
¾ cup milk
6 tablespoons Nucoa Margarine

Sift flour with baking powder and salt. Cut in 4 tablespoons Nucoa until coarse crumbs are formed. Add milk, stir with fork only until ingredients are moistened. Turn out onto floured cloth, knead gently until smooth on one side. Pat out to about ½-inch thick and cut with 2-inch cutter. Melt 4 tablespoons Nucoa in covered skillet. Place biscuits in skillet, cover, and cook 8 minutes over low flame. Turn biscuits over, add remaining 2 tablespoons Nucoa, cover and cook another 8 minutes. Serve hot. Yield: 12-15 biscuits.



An interesting recipe for class demonstration or for kitchenette and summer cottage informal cookery.*

MAKE INTERESTING BLIND TASTE-TEST COMPARING NUCOA IN THIS RECIPE WITH OTHER COMMONLY USED TYPES OF FAT

Your own choice may surprise you!

You will agree, we think, that there could be no tougher test of flavor than this recipe which subjects the fat to both heating in the mixture and melting in the pan.

We invite you to try this recipe three ways—(1) using Nucoa Margarine, (2) using hydrogenated shortening, (3) using the most expensive spread for bread. Then, in your home or classroom, conduct a blind taste-test. If the biscuits that score highest for "good flavor" turn out to be those made with Nucoa, or if the Nucoa biscuits tie with those made with the expensive spread for bread, it won't be the first time! Similar tests recently conducted with home economists and food editors in New York City surprised many of them very much.

NUTRITIONALLY RICH—APPETIZING—In cooking, as well as when used as a spread, Nucoa supplies, at moderate cost, the taste appeal and the nutrients for which this type of food is valuable in the diet. The makers of Nucoa themselves refine the pure vegetable oils churned with fresh pasteurized skim-milk in Nucoa. In their own food laboratory, 175 tests daily insure the *uniform* flavor, food value and smooth texture of Nucoa. No spread is richer in food energy . . . none a finer, year-round source of Vitamin A. And Nucoa is new-churned the year round, on order only. There is no "storage" Nucoa.

FREE! *Special Recipe Sheet giving eight unusual variations of this basic biscuit recipe. Standard notebook size. Write The Best Foods, Inc., Department 10, 88 Lexington Ave., New York 16, N. Y.

Nutritious NUCOA

so good "it melts in your mouth"

Nutrition in Cardio-Vascular Disease. Evidence is presented here to show that proper functioning of the heart throughout life is directly related to adequate nutrition. Deficiencies in certain of the various foods and vitamins affect specific changes in the cardio-vascular system. A deficiency of thiamine and niacin will produce definite physiological reactions of the heart. The nutritional role of cholesterol in human coronary arteriosclerosis has received much publicity, as has the role of vitamin E. The protein content of some of the diets recommended for cardiovascular disease has been investigated. The author feels that there is a need for increased amounts of protein because of the lowered efficiency of the heart during failure. Several points are made to indicate that inadequate diet and the lack of sunshine are the most important predisposing factors in the causation of acute rheumatic fever.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 134, July 19, 1947

Pathogenesis of anemia in infancy and childhood. W. W. Zuelzer.—p. 998.
* Classification of anemia in infants and children. J. M. Baty.—p. 1002.
* Treatment of anemias in infancy and childhood. H. G. Poncher.—p. 1003.
* Vitamin A and bone growth. Editorial.—p. 1019.

Vol. 134, August 2, 1947

* State of vitamin A in milk. Editorial.—p. 1178.

Vol. 134, August 9, 1947

* Meat in the diet of young infants. R. M. Leverton and G. Clark.—p. 1215.
Folic acid in blood. Editorial.—p. 1241.

Classification of Anemia. To determine the incidence of anemia in hospital practice, analysis of 1500 consecutive admissions to the Boston Floating Hospital was made. The greatest incidence of anemia occurred in children in the second year of life. Classified on an etiologic basis, infection and dietary deficiency were shown to be the two most frequent causes of anemia.

Treatment of Anemias. The peculiarities of the anemias of infancy and childhood are due to certain physiologic and pathologic factors of the age period in which the anemia develops. Some of these factors are more important at one age than at another. Therefore, the general therapeutic principles of anemia must be modified for each age period. Treatment of anemia in the newborn, in infants (one month to two years of age), in preschool children (two to six years of age), and in school children (six to twelve years of age) is discussed. Special stress is placed on nutritional factors as causes of the anemias in infants and preschool children. Because of the variations in the causes of anemia, treatment must be approached from a broad clinical perspective as well as from the point of view of the specific disciplines of hematology.

Vitamin A and Bone Growth. Recent animal experiments show that vitamin A plays a controlling part in the molding of bones. Vitamin A, when given in proper amounts, insures that bone growth will proceed along correct, predestined, and safe lines. When the vitamin is deficient, growth continues in an orderly but wrong way which leads to injury or even destruction of the nervous tissues and ultimately to death. The restoration of vitamin A to the diet of a deficient animal quickly brings about a response in the bone cells, directed to correct the dysplasia resulting from the absence of the vitamin.

Vitamin A in Milk. The chemical character of vitamin A in the milk of various breeds of cows and in the colostrum as compared to milk is discussed.

Meat for Young Infants. Strained meats were added to the formulas of babies six weeks old. Of thirty-three babies studied, eighteen received meat supplements and fifteen served as controls. Beef, veal, pork, and lamb were the meats used to increase the protein content of the formulas 25 per cent. No adverse symptoms occurred in the babies who received meat over the eight-week period, and their general well-being was better than that of the controls. The addition of meat to the formula not only checked the drop in the hemoglobin level which is characteristic of this age, but also promoted the formation of hemoglobin and red blood cells.

THE JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 169, July, 1947

* The methionine and cystine content of hen's eggs. F. A. Csonka, C. A. Denton, and S. J. Ringel.—p. 259.

Methionine and Cystine Content of Hen's Eggs. These experiments were made to show the influence of diet on the amino acid composition of eggs. It was found that the methionine and cystine content of the eggs varied from day to day whether the hen was on a low- or high-protein diet. These fluctuations were assumed to be normal physiological variations. To increase the levels of these two amino acids in eggs, the quantity of methionine in the hen's diet had to be sufficient and in peptide form. Significant increases in cystine and methionine values were obtained by supplementing a low-protein diet with casein (20 per cent). Supplementing the diet with synthetic methionine did not affect the levels of these amino acids in the eggs. When dietary protein was incomplete or when the protein in the diet was low, egg production stopped, indicating that the hen relies on the constituents of the feed for the synthesis of egg protein.

THE JOURNAL OF NUTRITION

Vol. 34, July 10, 1947

* Supplemental relationship between pork protein and egg protein. R. Hoagland, N. R. Ellis, O. G. Hankins, and G. G. Snider.—p. 43.
* Riboflavin excretions and test dose returns of young women during periods of positive and negative nitrogen balance. H. Oldham, E. Lounds, and T. Porter.—p. 69.
* Growth and longevity of rats fed omnivorous and vegetarian diets. A. J. Carlson and F. Hoelzel.—p. 81.
* Experiments with delayed supplementation of incomplete amino acid mixtures. E. Geiger.—p. 97.

Pork and Egg Protein. The supplemental relationship between the protein in pork and that in eggs, and the effectiveness of cystine and methionine in correcting the deficiency in pork were determined in experiments with young male albino rats. The protein in both fresh and cured hams contained insufficient cystine and methionine for optimum growth in rats when the diets contained 10 per cent of protein; but when the pork protein was supplemented with these amino acids, the growth promoting factor was equal to that of protein in eggs. Mixtures of equal parts of pork and whole egg protein had approximately the same growth promoting value as egg protein alone. Similar results were obtained with mixtures of equal parts of pork and egg white protein.

Riboflavin Excretions of Young Women. This study was made in order to observe the effect of high- and low-protein intakes on the nitrogen balances, on the excretions of riboflavin, and on the riboflavin test dose returns of young women. The subjects were three young women who were maintained on weighed diets for three periods of ten days each. Protein intakes were low during the first period, high during the second period, and low during the third period. Riboflavin intakes were relatively constant throughout the three periods and were somewhat lower than the recommended allowances for women. Most of the nitrogen balances were negative during the periods of low-protein intake; all were positive during the period of high-

MEAT

And Protein Deficiency

While protein deficiencies per se are difficult to recognize in their incipiency, conditions which lead to negative nitrogen balance are well known. The presence of any of the following states which characteristically exert an adverse influence on nitrogen balance, calls for immediate measures to prevent serious protein depletion:

1. Diseases of the digestive organs, which impair proper digestion and absorption.
2. Wasting diseases, infections and thyrotoxicosis, which increase protein breakdown and need far above normal levels.
3. Hemorrhage, burns, and chronic exudative processes, causing excessive loss of protein.

A high protein diet, whenever possible, is considered to be the most effective method of protein administration in the prevention and correction of protein deficiencies.

Meat, which readily is eaten two or more times daily, is an excellent component of the high protein diet. Meat is an outstanding source of protein for the following reasons: The protein of meat is biologically complete, capable of satisfying the body's protein needs. The percentage of protein contained in meat makes it one of man's most important protein foods. And, all meat is highly digestible—96 to 98 per cent—an important consideration especially in the presence of disease.

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protein intake. There was an inverse relationship between urinary riboflavin excretions and nitrogen balances. There was also an inverse relationship between the returns of riboflavin doses and the nitrogen balances in two of the subjects. Fecal riboflavin excretions did not appear to be influenced by variations in food intake and showed no relationship to the nitrogen balances.

Omnivorous and Vegetarian Diets. Two longevity studies and additional short-term studies of the growth of rats fed omnivorous and vegetarian diets are reported. Rats fed purely vegetarian diets were stunted in growth, mainly because of the unsatisfactory nature of the nutritive components of the diets. Rats fed an omnivorous diet not only lived significantly longer than rats fed a vegetarian diet, but their life span was more uniformly prolonged by intermittent fasting.

Delayed Amino Acid Supplementation. An investigation was made to determine the fate of amino acid mixtures which, because of a lack of one or more essential factors, cannot be utilized for protein synthesis. With delayed supplementation of the lacking amino acid, it was shown that the missing tryptophane, methionine, or lysine, when fed several hours after feeding of the "incomplete" mixture, did not promote growth. This finding supports the view that the "incomplete" amino acid mixtures are not stored in the body, but are further metabolized in an irreversible manner. It shows also that all of the essential amino acids must be present simultaneously for protein synthesis. These results should be considered when amino acid mixtures are prepared for therapeutic feeding.

NUTRITION ABSTRACTS AND REVIEWS

Vol. 16, April, 1947

* Production and modification of liver disease by diet. L. E. Glynn.—p. 751.

Liver Disease and Diet. There are two kinds of hepatic lesions induced by diet: (a) fatty infiltration with progressive fibrosis leading to portal cirrhosis and (b) necrosis resembling that seen in acute yellow atrophy. In a normal diet there are factors which prevent the deposition of excessive amounts of fat in the liver cells and factors which favor its accumulation. The role of lecithin and its constituent, choline, was early shown to be one of preventing the accumulation of fat in the liver. A deficiency of choline or of substances which can be used in the synthesis of choline led to fatty infiltration. Work with certain of the amino acids demonstrated that methionine, by donating methyl groups, can be used to manufacture choline. Therefore, diets which are low in protein and high in neutral fat will produce fatty infiltration most readily.

The observations that were first made on the development of necrosis in the liver were thought to be due to the same dietary conditions as caused fatty infiltration. However, later experiments showed that on diets containing 5 to 50 per cent of fat and 44 per cent of protein in which yeast was the only source of dietary protein, necrosis developed. Since yeast exerts strong lipotropic activity, the necrosis could not be caused by a lack of lipotropic agents. Casein added to the yeast diet prevented the necrosis. It was shown that methionine was the responsible factor, and the conclusion was drawn that it is a deficiency of the thio-amino-acids which leads to necrosis of the liver.

The influence of diet in protecting the liver against certain poisons and the mechanisms involved are also discussed in this paper.

NUTRITION, DIETETICS, CATERING

Summer, 1947

* Scientific approach to food problems during the war. J. Drummond.—p. 47.

The British war food policy and the future world food policy. J. B. Orr—p. 73

Scientific Approach to Food Problems. This is an interesting account of how Great Britain met its nutritional problems during the war. Development of the broad nutritional program began in 1939. The first task undertaken was that of ascertaining whether it was possible to provide each individual with the nutrients essential for health. The next problem concerned the import program and the possibilities of increasing agricultural production at home. The food plans which were made as a result of analysis of these problems were based on an understanding of the physiological needs of the people. Various surveys and research studies were made by the Ministry of Food to keep a check on the progress and results of the food program. Some of the investigations which were made are described. They emphasize the part played by the scientist in coping with the problems of a wartime diet.

SCIENCE

Vol. 106, July 18, 1947

Influence of dithiopropanol (BAL) on human lead metabolism. H. W. Ryder, J. Cholak, and R. A. Kehoe.—p 63.

* Blood plasma ascorbic acid levels on controlled intakes of ascorbic acid. M L. Dodds and F. L. MacLeod.—p. 67.

Vol. 106, July 25, 1947

The native protein. D. Wrinch.—p. 73.

Vol. 106, August 8, 1947

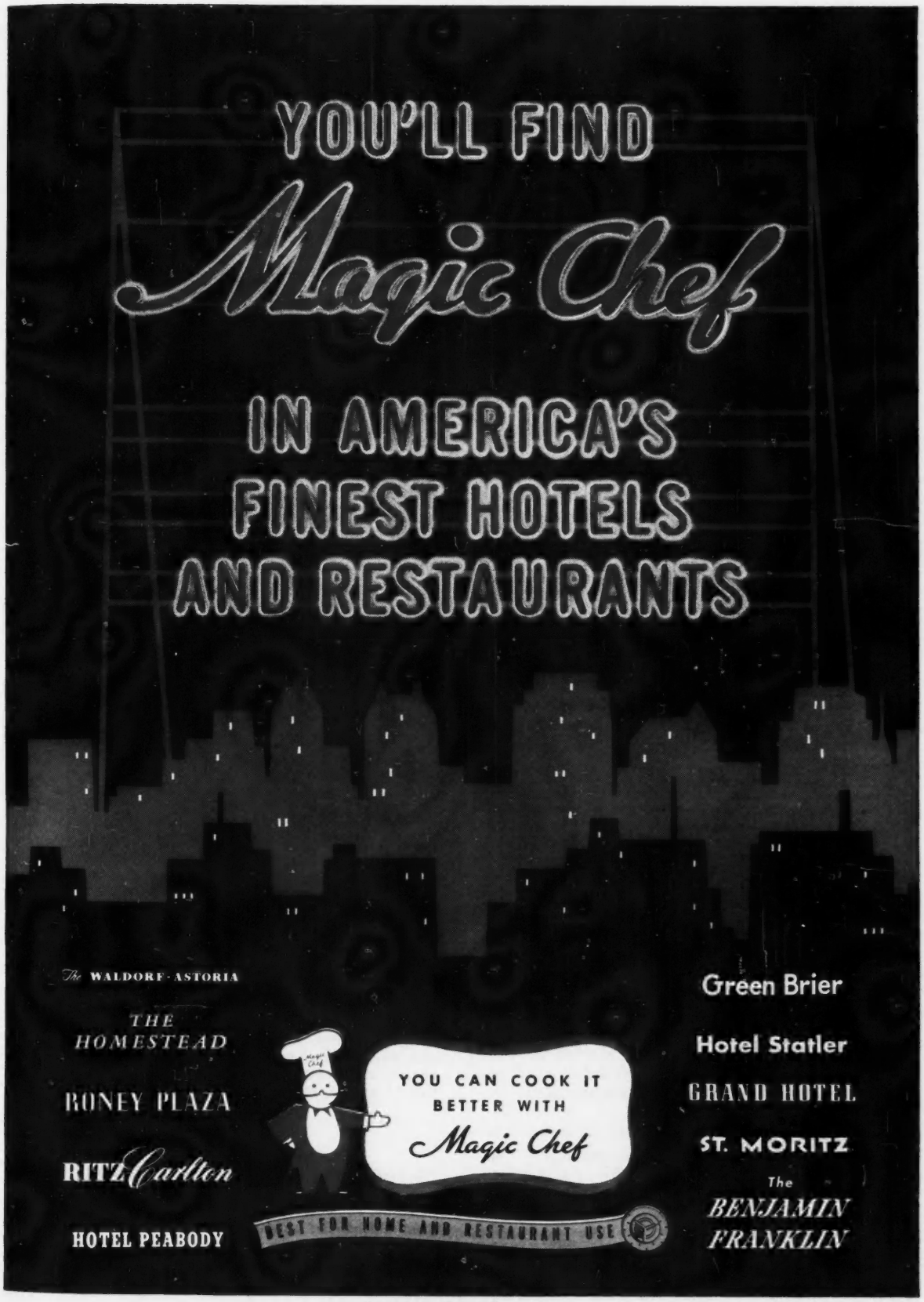
* Effect of certain substances on the prevention of diabetogenic action of alloxan. S. Banerjee.—p. 128.

Vol. 106, August 15, 1947

Hexokinase activity and diabetes mellitus. R. H. Broh-Kahn and I. A. Mirsky.—p. 148.

Blood Plasma Ascorbic Acid Levels. A report is given of a series of studies in which college women were maintained on controlled intakes of ascorbic acid. The diets, which contained an average of 7.1 mg. of reduced ascorbic acid, were supplemented by 50, 75, and 100 mg. doses of the synthetic vitamin. For six days or two weeks preceding the experimental periods the ascorbic acid intake was limited to 25 mg. At this intake the blood plasma ascorbic acid values of the subjects decreased or were barely maintained. At the higher levels of intake a wide range of ascorbic acid values was observed. These variations emphasize the need for careful interpretation of plasma ascorbic acid values, especially in population survey studies where they are used as an indication of vitamin intake.

Diabetogenic Action of Alloxan. It was observed accidentally that niacin prevented the diabetogenic action of alloxan in rabbits and rats. To explain the mechanism of action of niacin, a study was made of the inhibitory effect of various substances on the action of alloxan. Among the substances used were 1,2-dimethyl-4-amino-5(d-l′-ribityl-amino)-benzene; niacin; calcium pantothenate; glycine; benzoic acid; para-aminobenzoic acid; ascorbic acid; pyridoxine hydrochloride; pyridine-dicarboxylic acid; and 2-phenylquinoline-4-carboxylic acid. From this study it was concluded that substances containing just the carboxyl group or just the pyridine ring of niacin could not prevent the development of persistent hypoglycemia and glycosuria when alloxan was given. However, substances such as niacin, pyridine-dicarboxylic acid, and 2-phenylquinoline-4-carboxylic acid, which contain both the carboxyl group and the pyridine ring, could inhibit the diabetogenic action of alloxan. It is possible, therefore, that niacin may aid in the prevention of diabetes.



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SOUTHERN MEDICAL JOURNAL

Vol. 40, July, 1947

* The diagnosis and treatment of peptic ulcer. J. W. Larimore.—p. 572.
Observations on the specificity of the folic acid molecule. T. D. Spies, R. E. Stone, and R. O. Brandenburg.—p. 618.

Treatment of Peptic Ulcer. Included in this review of ulcer diagnosis and treatment is a short discussion of diet. The author states that the diet of an ulcer patient may be very liberal and normal. Too often hospital diets are arranged in a progression based on fear of trauma and distention and are unrelated to the status of the ulcer or to the adequacy of gastric motility. Without gastric motor impairment only raw, sour, and spiced foods need be eliminated. A dry diet is more helpful in taking up the gastric secretions than a liquid diet.

AMERICAN RESTAURANT

Vol 31, July, 1947

Spiller's—where a layout pattern came to life. W. D. Holden.—p. 31.
* Be your own inspector, it pays. J. B. O'Meara.—p. 38.
* Methods of food control. H. W. Esperson.—p. 54.

Be Your Own Inspector. This concluding article in a series on a restaurant inspection system contains excellent ideas for checking up on the cleanliness and neatness of an eating establishment. A detailed list of inspection points is included.

Food Control. The "fourteen-point program" for food cost accountants can well be considered by every restaurant operator. Because food control has such a broad scope, careful attention must be given to each phase of food production: purchasing, receiving, storing, issuing, menus, and preparation and service. With the proper control, the restaurant operator is in a position to find existing faults and take the necessary steps to correct them.

BUILDINGS

Vol. 47, August, 1947

A man-hour guide to cleaning efficiency. G. R. Bailey.—p. 27.
* A new approach to cleaning. F. L. Gilbert.—p. 28.
* Written schedules obviate costly oversights. T. H. Maenner.—p. 31.

Approach to Cleaning. This discussion stresses the inadequacy of present day cleaning methods. The author presents his formula, "The Gilbert Formula," for determining the cleaning area to be allotted to cleaners. It reflects, on the basis of work units, the proper distribution of space in a given building and provides, as nearly as possible, an equitable distribution of the work. Sample charts to aid in establishing the formula are pictured.

Written Schedules. Work schedules, which define the responsibilities of each employee, play an important part in the management of an organization. This article outlines a number of work schedules for building maintenance employees. The schedules are flexible and suitable for application in other situations.

COLLEGE AND UNIVERSITY BUSINESS

Vol. 3, August, 1947

Male or female employees in food service. R. A. Spicely.—p. 23.
* 60,000 meals the minor part. R. R. Reed.—p. 32.

60,000 Meals. Food service at Arizona State College presents many interesting problems, especially where student relationships are concerned. The author explains the physical set-up of the dining room and kitchen and describes the type of menus used. Then, in a humorous manner, she discusses some of the personnel problems which make college food service interesting.

FOOD INDUSTRIES

Vol. 19, June, 1947

Effect of oxygen on color and flavor of heated milk. N. P. Tarassuk.—p. 97.
* Fresh fruit essences available for use as flavoring material —p. 101.

Vol. 19, August, 1947

How jellied cranberry sauce is preserved by freezing. M. M. Boggs and G. Johnson.—p. 97.
* Temperature of freezing affects tenderness of beef. R. L. Hiner and O. G. Hankins.—p. 108.

Fresh Fruit Essences. There is an increasing interest in the fruit "essence" process, which is now being applied to the isolation of the volatile constituents of the essential flavor and aroma of many fruits. Flavors such as apple, peach, grape, blackberry, strawberry, pineapple, apricot, and sour cherry have been successfully concentrated to ten to twenty-seven times their natural strength. Because of the high volatility of the flavor compounds, the essences cannot be used successfully in conjunction with heat processing. They are, however, used in ices, sherbets, jelly, candy, and pharmaceuticals. A method for preparing full-flavor apple jelly, worked out by the Department of Agriculture, is given.

Freezing Beef. Histological studies were made to determine the effect of freezing on the tenderness of beef. When the freezing process was slow (as at 18° F.), water was withdrawn from the fibers of the meat and frozen between them, creating large ice areas that left the fibers bunched in irregular shapes. When the freezing process was more rapid (as at −114° F.), there was no time for the water to be withdrawn from the fibers. Thus, small ice crystals were formed within the fibers which were split longitudinally. As a result of the increased fiber rupture and the stretching and rupturing of the interstitial connective tissue at the lower temperatures, the tenderness of the meat was increased.

HOSPITAL MANAGEMENT

Vol. 64, July, 1947

* New kitchen doubles production with no increase in size.—p. 84.
* Accounts and records in food cost control.—p. 92.

New Kitchen. At Montefiore Hospital, Pittsburgh, a complete renovation of the kitchen was undertaken. As a result of careful planning the newly arranged kitchen, with its improved equipment, is capable of serving twice the present number of meals. The new equipment and the general arrangement of the kitchen are briefly described.

Food Cost Control. Food cost records kept in a very small food service may be more important for the financial record of the business than for managerial control. Records should be installed, therefore, that tell the financial story daily and should take a minimum of time to keep up to date. A simple food cost control system should consist of a budget, income and expense accounts, records, control of purchasing, storeroom control, kitchen control, service control, and reports of performance.

HOSPITALS

Vol. 21, August, 1947

* Train takes meals to wards from central kitchen.—p. 65.
Standards for processed foods are buying aids. Comment.—p. 67.

Trains Take Meals to Wards. At Colorado State Hospital, Pueblo, an unusual centralized-decentralized food

An adequate diet is made up of essential nutrients. In addition to knowing these essential nutrients, it is necessary to know what foods contain them in order to plan an adequate diet. Considering the large amount of canned foods used throughout the United States one readily realizes their contribution to the daily diet.

Research of many years has proven that canned foods as a class are good sources of the essential nutrients. To ascertain the latest information on the nutritive content of today's canned foods an extensive research program was started jointly in 1942 by the National Canners Association and the Can Manufacturers' Institute. It is still in progress. During the first three years more than 1500 samples were collected and assayed. The research work was carried out at several universities and colleges under the direction of recognized nutritionists. Results of this work have been published and are to be found in the scientific literature. However, the findings are summarized here for your convenience.

Vitamins The results of the research show that canned foods are dependable sources of vitamins where the original raw product is known to contain nutritionally significant amounts of these nutrients. The vitamins included in the study were ascorbic acid, carotene (provitamin A), thiamine, niacin, riboflavin, and pantothenic acid. Improved canning methods are being used today involving technological advances in equipment as well as procedure. These advances coupled with "on the spot" canning of the food contribute to substantial vitamin retentions.

Minerals In the survey canned foods were assayed for the three minerals, calcium, phosphorus and iron. It was found that the preparation procedures of canning involve only moderate losses of minerals and the heat processing, none at all.

Proteins, Carbohydrates and Fats The effects of canning on proteins, carbohydrates and fats in foods have not been extensively studied, but indications are that they are not adversely affected by heat processing, but rather the cooking process makes the plant or animal tissues easier to digest. The foods high in these nutrients in the raw state can be expected to be high in them when canned. In some cases the canned foods are higher in these values due to such additions as sugar sirup to fruits, which increases the carbohydrate content; or of oil to fish, which increases the fat content.

Cooking Methods The research also covered the final nutritive content of canned foods using various meal preparation methods. The most important finding reported the presence of appreciable quantities of the soluble nutrients in the liquid portions of canned foods. This emphasizes the advisability of using the liquid in food preparation.

Canned Foods and the Basic Seven Follow the Government's Basic Seven Food Chart in selecting foods for an adequate diet. Canned fruits, juices, vegetables, milk, cereals, meats, poultry and seafood help supply foods for six of the Basic Seven groups. Certain of the canned food specialties which contain butter or margarine contribute toward the seventh.

Since a greater part of our food is eaten in cooked form, it is well to remember that canned foods are scientifically cooked foods. Remember, too, variety in diet is essential not only for appetite appeal, but in order to include the various essential nutrients.

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service system is in operation. At present there are five separate buildings which are served by a central kitchen. A subway food train links the kitchen with the many small cafeterias located in the ward buildings. Food cars are filled in the central kitchen, then lowered by elevator to a subway terminal, and hooked in tandem fashion to a battery-powered locomotive. When the cars reach their destination, they are wheeled into the serving counter and the food is served without transfer. Some foods, such as pancakes and meat patties, are prepared in the central kitchen, but cooked on the wards. These and other procedures which are part of the decentralized service are pointed out.

HOTEL MANAGEMENT

Vol. 52, August, 1947

How to survey employee opinion W. Byrd, Jr.—p. 37.
* Why we must never let up on our eternal quest for quality. S. J. Sexton.—p. 40.
* Principles of kitchen layout. A. W. Dana —p 51.
* Dignity in washing dishes M. M. O'Donnell.—p. 54.
* Profit plates. A. Easton.—p. 62.

Quest for Quality. "It takes quality foods to make a successful eating establishment." With this thought in mind, the author points out the factors to be considered in selecting quality foods, especially those which are canned and frozen.

Principles of Kitchen Layout. This article, the fourth in a series on kitchen planning, deals with menu production and analysis, and indicates ways in which the menu pattern may be translated into equipment needs. A sample menu and production analysis chart is included and is of special value in compiling flow charts for each piece of equipment involved in food preparation.

Dignity in Washing Dishes. It takes skill to operate a mechanical dishwashing machine. If sanitation methods in dish rooms are to be improved, if breakage and noise are to be cut down, and if maximum efficiency is to be attained, the status of dishwashers must be improved. Procedures are suggested which will help improve dishwashing techniques and give greater recognition to dishwashers.

Profit Plates. Suggestions are given for combinations of foods which are attractive in appearance and which conform to nutritional standards. Ten club plates are listed under each of three headings: low priced, medium priced, and high priced.

HOTEL MONTHLY

Vol. 55, July, 1947

* A good food department needs room to expand —p. 44.

A Good Food Department. Enlarging a restaurant and still maintaining high standards of food service presents challenging problems. The methods used by one small hotel in its expansion program contain some excellent suggestions which can be applied to any commercial food service organization. Equipment, room decorations, food specialties, and personnel policies are among the topics discussed, and a number of pictures are included.

THE MODERN HOSPITAL

Vol. 69, August, 1947

Formula room—experiment in terminal sterilization. R. H. Lowe.—p. 48.
* The functional basis of hospital planning—dietary department. Division of Hospital Facilities, U. S. Public Health Service.—p. 65.
* Let's plan menus. D. A. Boyle.—p. 102.

Basis of Hospital Planning. This article on efficient kitchen design is a discussion of the various aspects of dietary department planning. The location of the department itself; the type of service used, as centralized or decentralized; and the main components of the dietary department (food refrigeration and storage, cooking, serving, special diets, dishwashing, dining, and formula preparation) are considered. A table listing the area required for dietary facilities in hospitals of various sizes and several flow charts help to illustrate the need for more adequate planning of dietary departments.

Planning Menus. Although the menu suggestions are intended for hot weather days, many of them can be used in any season. Combinations are given for a variety of appetizers: juices, canapes, relish trays, fruit cups, salads, and sea food cocktails. Hints for developing interesting flavors are not forgotten.

PERSONNEL

Vol. 24, July, 1947

* Measuring the effectiveness of personnel work.—p. 2.
* A joint management-labor meirt rating program. N. L. A. Martucci.—p. 17.

Effectiveness of Personnel Work. There is a growing interest in the appraisal of the results of good personnel administration. Management is feeling the need for more specific standards of performance and admittance to the profession and is endeavoring to establish a group of measures which can be utilized for the appraisal of each function of a personnel department. Because dietitians and other food service administrators are often responsible for their own personnel problems, these measures can find application in their departments. For example, such measures as turnover, absenteeism, experience ratings, and tardiness can be used to evaluate the function of maintenance of a stable work force. Similar measurement factors can be developed for other functions of the personnel department. Further thought needs to be given to this problem in order that the effectiveness of personnel programs can be increased.

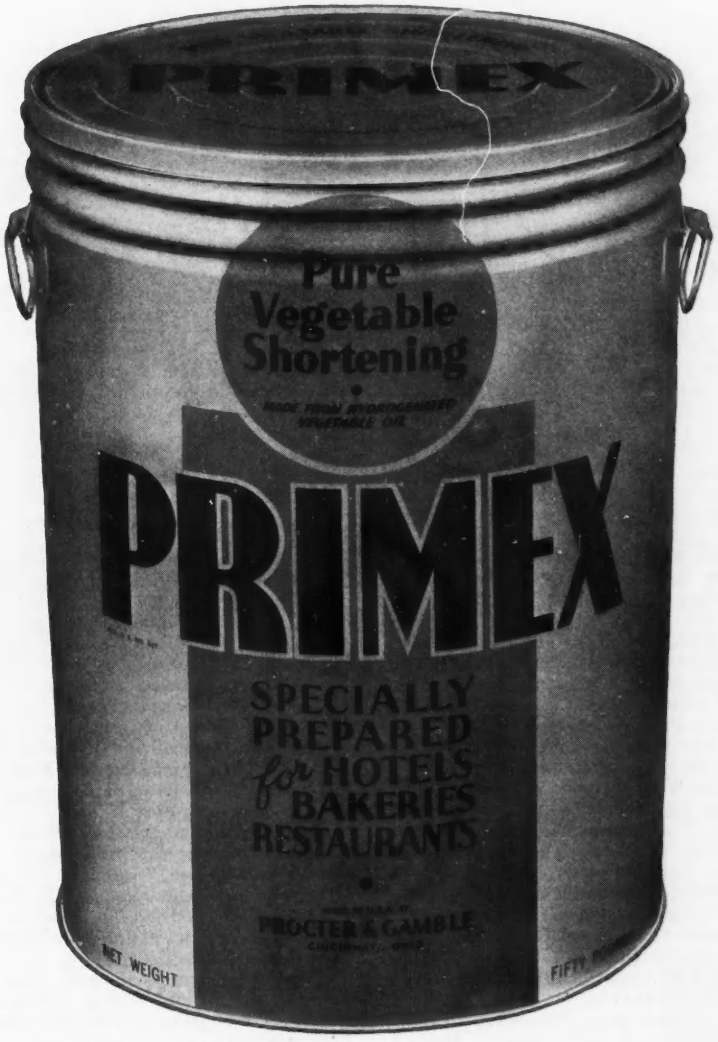
Merit Rating Program. An employee rating program is a technique which aids supervisors in determining which employees are deserving of wage increases and in comparing the merits of individual employees. This program, which often is installed following a job evaluation program, is most successful when it is the product of a joint management-labor committee. The author gives suggestions for the selection of a committee and discusses the content of the program. The training of supervisors in procedures of rating and in methods of interviewing employees to review ratings is emphasized.

PERSONNEL JOURNAL

Vol. 26, June, 1947

* How efficient are your hiring methods? R. N. McMurry.—p. 45.
Employee publications for interpreting the personnel program. R. D. Breth.—p. 54.
Some common errors in employee merit rating practices. W. R. Mahler—p. 68.
Outline of a complete training program. H. P. Mold.—p. 75.

Hiring Methods. Efficient employee selection makes use of three distinct procedures: the application, the employment test, and the interview. The least understood of these three procedures is probably the employment test which, according to its content measures one of the following: (a) intelligence or mental alertness, (b) aptitudes, (c) proficiencies, (d) vocational interests, or (e) temperament or personality. Because no employment test can be used with confidence until its validity has been determined, a validation study should be made. Even then, great care is required in using the various tests. The author points out some of the problems involved in using the employment test correctly.



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A 50-pound can of Primex fills a space of about one cubic foot. And in that cubic foot the maximum in frying efficiency has been crowded.

Primex, because it is pure and bland, can't mask the natural flavor of any food you fry in it. Foods properly fried in Primex absorb a minimum of fat . . . are crisp and appetite-appealing. And because Primex is all-vegetable, foods fried with it are *digestible* as well as delicious.

Primex frying is economical, too. Careful selection of the vegetable oils used in making Primex, plus rigidly controlled manufacturing processes, give you a frying fat that stands up under the heaviest frying schedule. Primex won't smoke at proper frying temperatures.

Frying with Primex is the time-tested way to produce appetizing, digestible fried foods economically. You'll find Primex a sound investment from *every* angle. PROCTER & GAMBLE

PRIMEX **The shortening that sets the quality standard—all-vegetable, all-hydrogenated shortening!**

News Notes

Northwestern University Nutrition Center. A new department in the Medical School of Northwestern University has been formed. The University and the Spies Committee for Clinical Research have announced an agreement to establish a national center for medical research in the field of nutrition and metabolism. Dr. Tom D. Spies, associate professor of medicine at the University of Cincinnati, will become professor of nutrition and metabolism and chairman of the new department. The Spies Committee will grant to the University at least $150,000 annually for five years to cover the expenses of this department and pay for research carried on by and under Dr. Spies.

El Salvador Joins FAO. El Salvador has become the forty-ninth member government of the United Nations Food and Agriculture Organization. Because El Salvador was represented at the Hot Springs Conference on Food and Agriculture in 1943 and on the FAO Interim Commission, she was eligible to membership as soon as she ratified the FAO constitution. At the present time nineteen of the twenty Latin American nations are members of FAO.

New Dietetic Interns. The Veterans Administration has appointed thirty-one dietetic interns to take training during the coming year. They began their work in July—six at the Bronx Veterans Hospital, eighteen at Hines, Illinois, and seven in Los Angeles.

Dietetic Interns Graduate. Graduation day for dietetic interns at the *University of Michigan Hospital*, Ann Arbor, was August 27. On that day Dr. Albert C. Kerlikowske, hospital director, presented certificates to twenty young women who had completed their year's training as interns. This graduation brought to 357 the number of dietitians the hospital's Department of Dietetics and Housekeeping has trained since 1924. Director of the course is Mable MacLachlan, president of A.D.A.

Five dietetic interns completed their training at *Texas State College for Women*, Denton, on August 28. The day before graduation, the class was honored by a coffee party. Since 1942, when this administrative training course was approved by A.D.A., twenty-five dietetic interns have been trained. This year's class included Phyllis Roose, Goshen College; Margaret Frederickson, Pennsylvania State College; Greta Swanson, Iowa State College; Dorothy Urban, Pennsylvania College; and Thelma Ernst, University of Illinois.

Meetings. The *Twentieth Graduate Fortnight* of the New York Academy of Medicine will be held October 6 to 17. The subject of this year's meetings will be "Disorders of Metabolism and the Endocrine Glands." The program includes morning panel discussions, afternoon clinics, evening lectures, scientific exhibits, and demonstrations. Some of the papers to be presented include: "Hypertension," by Hans Selye; "Energy Metabolism in Obese Persons," by Louis H. Newburgh; "Psychological Aspects of Obesity" by Hilde Bruch; "Metabolic Functions in Old Age," by Nathan Shock; and "Role of Amino Acids in Nutrition" by William C. Rose.

In Cincinnati a *Symposium on Nutritional Anemia* will be held October 16, 17, and 18 under the auspices of the College of Medicine of the University of Cincinnati. Organized and sponsored by the Robert Gould Research Foundation, the symposium will include such topics as "The Metabolism of Iron and Copper," "The Physiology of Folic Acid," "B Complex and Anemia," and "Vitamin C and Anemia." Among the speakers will be M. M. Wintrobe; M. Schultze; C. V. Moore; George Guest; C. A. Elvehjem; William J. Darby; W. H. Sebrell; W. W. Zuelzer; and Richard Vilter.

School Lunch Managers' Institute. Mississippi held its first statewide School Lunch Managers' Institute during the month of August. The two-week program, which included round table discussions, conferences, laboratory work, study, and recreation, was well attended. Outstanding speakers contributed to the program, and the Mississippi Dietetic Association furnished two members for the Institute. Dr. Blanche Tansil, head of the Home Economics Department of the University of Mississippi, was instrumental in organizing the Institute.

Food as a Career in the Armed Forces. Sixty Regular and Category One officers of the Army, Navy, Marine Corps, and Air Forces now have an opportunity to make a career of the preparation and serving of food. Officers wishing to undertake this specialty will be sent to the Quartermaster School at Camp Lee, Virginia. The nine-month advanced food course is preliminary to one given by the Training Division of the Food and Container Institute, where officers receive instruction in procurement, marketing, storage, and shipment of foods.

Corn Enrichment Conference. On July 14 and 15, at Clemson Agricultural College, Clemson, South Carolina, representatives from eighteen states and the District of Columbia met to discuss and formulate plans for action in extending the program for enrichment of corn products. During the first day of this Corn Enrichment Conference addresses were made by W. H. Sebrell, C. A. Elvehjem, M. L. Wilson, Norman Jolliffe, and R. R. Williams. On the second day those in attendance discussed the problem and related experiences in trying to convince millers to enrich corn products.

A.D.A. Loan Library. New bulletins and pamphlets which are now available to A.D.A. members from the Loan Library are as follows:

Good Grooming Portfolio, which includes charts on "Grooming for Job" and other information helpful in a training program.

Educators Guide to Free Films, 1947 edition.

How to Develop Competent Supervision and *Planning and Administering Effective Incentives*—two bulletins published by the American Management Association.

Group Feeding of Children—a manual prepared by the Michigan Department of Health.

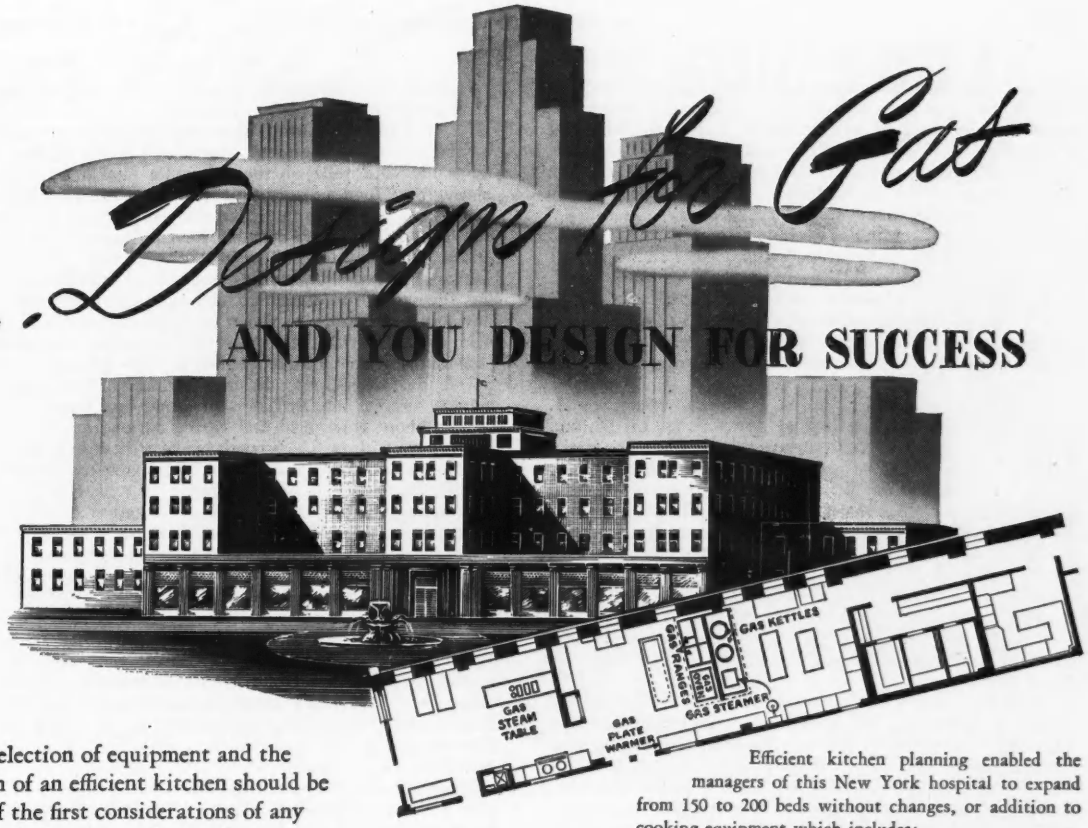
Diet Manual, 1947 edition, prepared by the Nutrition Department of Presbyterian Hospital, New York City.

So Help Me!—a booklet of cartoons and rhymes which give suggestions on specific ways to prevent accidents and which can be used in the training of employees.

Revised List of Films on Nutrition. A third revision of

...Design for Gas

AND YOU DESIGN FOR SUCCESS

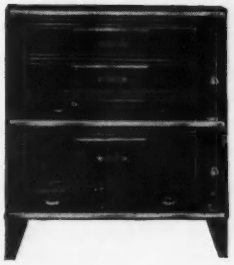


The selection of equipment and the design of an efficient kitchen should be one of the first considerations of any hospital planning, whether for new construction or modernization.

Efficient kitchen planning enabled the managers of this New York hospital to expand from 150 to 200 beds without changes, or addition to cooking equipment which includes:

one combination roaster-baker
one solid top ovenless range
one solid top range
stock kettles, urns, toasters

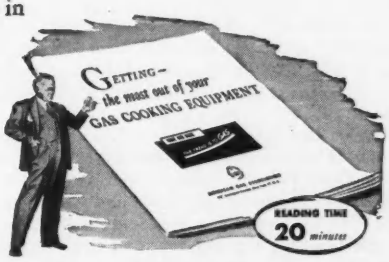
Prior planning is one key to efficient arrangement and economical operation of a successful hospital kitchen where special diet and large volume cookery must be accomplished on a strict schedule and within limited time. The other keys to successful hospital kitchen operation are GAS and modern Gas Equipment.



GAS is the ideal fuel for hospital kitchens because it is clean, dependable, readily available, and because comfortable working conditions in GAS kitchens attract higher types of employees.

Modern Gas Equipment is ideal for hospital kitchens because it is automatically controlled, simple to operate, dependable, and easy to maintain. Efficient Gas cooking equipment assures superior results in flavor, color, texture and in the reduction of waste.

Architects, designers, and hospital managers can obtain invaluable assistance in the selection of modern Gas Equipment by calling the Commercial Representative at the local Gas Company.



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the mimeographed compilation, "A Few Selected Films on Nutrition," has been prepared by Adelia M. Beeuwkes, assistant professor of public health nutrition, School of Public Health, University of Michigan, and Ford L. Lemler, supervisor, Audio-Visual Education Center, Extension Service, University of Michigan. The films listed have been classified in five categories: "Dietary Essentials," "Digestion and Metabolism," "Food Preservation," "Food Production and Distribution," and "Nutrition and Its Social Implications." A description of the content of each film is given in addition to information as to where each film may be obtained, the rental charge, an appraisal of each film's value, and a description of its content. Copies of this annotated list may be obtained by writing to Miss Beeuwkes.

Colonel Blanchfield Retires. Colonel Florence A. Blanchfield, chief of the Regular Army Nurse Corps, and the first American woman to receive a full commission in the Regular Army, has retired from active Army service. Colonel Blanchfield has the same serial number as General Pershing (serial number 0-1) and received her commission in a personal presentation made by General of the Army Dwight D. Eisenhower. She entered the Army Nurse Corps thirty years ago. In June, 1945, Colonel Blanchfield was awarded the Distinguished Service Medal for her devotion to duty. She has also received high tribute from General George E. Armstrong, deputy Surgeon-General, for her outstanding ability and for her fine record in organizing the Army Nurse Corps.

Obituary. Helen W. Atwater died on June 24. For many years prior to her retirement in 1941 she served as editor of the *Journal of Home Economics*. She has also made many contributions outside of her chosen field of work. For twenty-four years she served on the Women's Joint Congressional Committee. She was a fellow of the American Association for the Advancement of Science, and in 1942 was made chairman of the Committee on Hygiene of Housing of the American Public Health Association.

Dr. Berryman Appointed to Food and Container Institute. Dr. George Hugh Berryman, formerly director of the Medical Nutrition Laboratory of the Office of the Surgeon General, has been made chief of the Nutrition Branch of the Quartermaster Food and Container Institute for the Armed Forces. Dr. Berryman has done considerable research in the diseases of the liver and the role of food in the regeneration of plasma proteins. In the Army he developed a short method of evaluating diets and subsequently worked on the effects of deficient diets upon physical and mental efficiency. As chief of the Institute's Nutrition Branch, Dr. Berryman will correlate the findings of its Committee on Food Research and apply them to the development of Army rations.

A.D.A. Member Featured. Ethel Boyle, supervisor, Division of Home Economics and Nutrition of the Illinois Department of Public Welfare, recently received recognition in the *Welfare Bulletin*, the official publication of this department. An article, which is one of a series of sketches on institution and division personnel, tells of Mrs. Boyle's experience in the field of dietetics, her participation in community activities, and her outstanding accomplishments on the job.

Food Mission to Germany. Two A.D.A. members were among the group who recently returned from a food mission to the U. S. and British zones of Germany. They are Esther Batchelder, head of the Foods and Nutrition Division of the Bureau of Human Nutrition and Home Economics, Department of Agriculture; and Jane Ebbs, nutrition advisor to the Secretary of War. Other members of the mission included Helen Oldham, assistant professor of home economics at the University of Chicago, and Vera States, administrative assistant from the office of the Quartermaster General. The purpose of the mission was to attempt to increase the use of corn and dry skim milk in the U. S. and British zones. Miss Oldham, who has reported on the mission's experience, describes the inadequate German diet and tells of the mission's efforts to improve methods of food preservation and preparation. Because of the shortage of canning jars, it was decided that home dehydration was more suitable for conditions in Germany at the present time. The aid of a German newspaper woman, Margot Shubert, was enlisted. Frau Shubert used her ingenuity in setting up the equipment necessary to develop satisfactory methods of home dehydration. She also wrote, in typical German style, a booklet on dehydration and another on corn. These booklets included a number of tested recipes. In the meantime, the American women toured the British and American zones, telling millers about corn meal and giving suggestions along the line of corn milling. As a result of the work of Frau Shubert and the members of the mission, better corn meal products and the introduction of dehydration as a method of food preservation have been brought to Germany.

Reprints Available. "Qualified Dietitians Needed," the article written by Lucille M. Refshauge, Educational Director of A.D.A., for the June issue of *Practical Home Economics*, is now available in reprint form. Copies may be obtained from the Chicago office of the American Dietetic Association.

British Dietetic Association Officers. At the annual meeting of the British Dietetic Association held on March 29 of this year in London, the following officers were elected: Chairman, Dorothy F. Hollingsworth; Vice-Chairman, Miss R. M. Simmons; Honorary Secretary, Miss H. T. Marshall; and Treasurer, Miss M. R. Muriel.

Training of Dietitians in Australia. In February of this year a one-year training course for dietitians was inaugurated at Royal Perth Hospital, Western Australia. Requirements for entrance to this course include either a B.Sc. degree plus training in cooking and other subjects, or a Diploma of Institutional or Household Management from a recognized school. Up to this time there had been no opportunity for Western Australian girls to take dietetic training unless they went to Melbourne or Sydney. This coming year the hospital will accept two or three students for training. They will receive practical and academic experience in normal nutrition, therapeutic diet regime, and general food administration.

New Publications of Food and Container Institute. *Ration Development*, the latest in a series of Operation Studies entitled *A Report on Wartime Problems in Subsistence Research and Development*, has recently been released by the Food and Container Institute of the Armed Forces.

A second new publication of this organization is *The Role of Starch in Bread Staling* by W. F. Geddes and C. W. Bice. Included is such information as: Why Bread-Staling Is a Problem; The Meaning of Bread-Staling; Methods of Evaluating Staling; and a Suggested Program of Future Research. An annotated bibliography of the scientific and technological literature is also given.

Dried Eggs for School Lunch. The Department of Agriculture announced recently that over 1,700,000 lb. of dried whole eggs will be distributed without cost to school lunch programs and welfare institutions in twelve northeastern states. Equivalent to 172,000 cases of shell eggs, they are part of the stocks which were acquired by the government under a price-support program. One third of a pound a month will be allowed for each child under the Federal School Lunch Program and ½ lb. a month for each adult in eligible institutions.

Better Buymanship Booklet. The Household Finance Corporation's booklet on *Food Fats and Oils* has been re-

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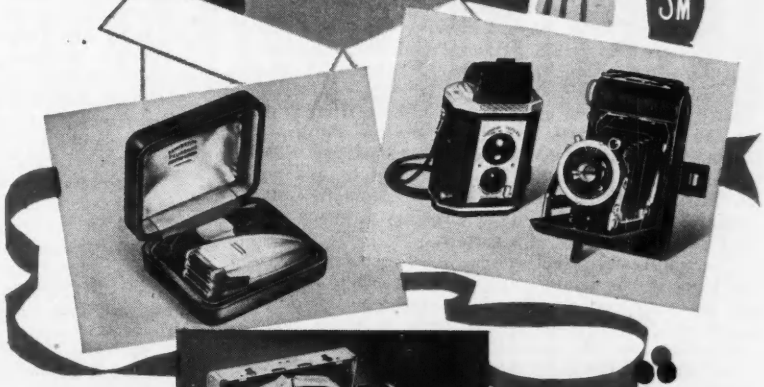

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vised and information on these subjects has been brought up to date.

Good Breakfast Week. In Arizona, the Maricopa County Chapter of the Nutrition Service of the American Red Cross conducted a Good Breakfast Week. Their report, which is published in booklet form, contains many interesting posters and examples which show nutrition education which can be carried out in a community.

Study of Rutin. A research grant for the study of rutin has been made to the University of Nebraska, Lincoln, by the Smith-Dorsey Company. The work will be under the direction of Dr. Harry Miller, director of the University's chemurgy project, a division of the College of Agriculture. Rutin, which is derived from buckwheat, is used in the treatment of capillary fragility. Dr. Miller intends to select varieties of buckwheat which are high in rutin content and conduct plant breeding studies in an attempt to develop a superior strain. He also intends to try a new method of extraction of rutin from the buckwheat plant.

New Director of General Foods Research. Charles W. Kaufman has been named director of research and development for the General Foods Corporation. Mr. Kaufman will have direct responsibility for the operation of General Foods' corporate research program which functions at the Central Laboratories in Hoboken, New Jersey, and will also coordinate research activities carried out in other General Foods units.

More Mushrooms Go into Cans. The popularity of canned mushrooms and canned mushroom soup is on the increase, according to Department of Agriculture marketing specialists. Figures reported by the industry show that more of the crop is going into cans and less is being marketed fresh. In 1946 the commercial production of mushrooms reached 63 million lb., 15 million more than in 1945 and 25 million more than in 1938. Pennsylvania, the largest mushroom-producing state, supplies over half the annual supply. The canned mushroom pack in this country amounts to nearly half a million cases a year. Recent studies made at the Massachusetts Experiment Station showed that commercially canned mushrooms are a rich source of the B vitamins and also contain some iron, protein, and carbohydrates. The chief reasons for the popularity of the mushroom are its flavor, its adaptability to many dishes, and its attractiveness as a garnish.

Normal Waste. Whether vegetables are being purchased for home or community canning, or for school lunch use, the important cost consideration is the proportion of waste to expect. The percentage of waste in seven common vegetables has been calculated by the Bureau of Human Nutrition and Home Economics. Those having the most waste were corn, with 74 per cent of the weight in husks, cobs and culls; and Lima beans, with 69 per cent of the weight in pods. Least wasteful were summer squash, with only 13 per cent of the weight in stems and necks, and beets (without tops), with only 18 per cent in skins, roots, and stem ends. Weight loss in okra amounted to 28 per cent; in sweet potatoes, 20 per cent; and in pumpkin, 36 per cent.

Fish to Be Plentiful. Fresh and frozen fish will continue to be good buys for budget meals for the new few months. This suggestion was made by the Bureau of Agricultural Economics of the Department of Agriculture, in a recent report on the national food situation. Canned fish supplies are expected to be more plentiful when the new packs of salmon and tuna reach retail markets, but the prices of these fish will probably continue to be high. Although more fish will be served on American dinner tables during 1947 than during 1946, Americans still will not eat as much canned fish as they did before the war.

Concentration of Fruit Juices. At the Michigan Agricultural Experiment Station studies have been made on the concentration of fruit juices by partial freezing. The process has been applied to juices obtained as by-products from the preparation of purées from Michigan fruits. Black raspberry, sour cherry, tomato, plum, and grape juices have been used. Successful concentrates were made from all but the tomato juice. Samples of the various original juices and concentrates were made up to beverage strength after defrosting. It was suggested that several might be improved by using carbonated rather than plain water for dilution. Grape and plum concentrates were sweetened and made excellent sundae sauces. Fruit concentrates made by freezing and centrifugation seem to be suitable for commercial use by soda fountains, and also for consumer use in the home, since the fresh flavor of the fruit is retained by the freezing process. A leaflet describing this work, is available from the Michigan Experiment Station, East Lansing.

News about Members

The following members of A.D.A. have recently accepted new positions or appointments:

Judith B. Alexander, on August 1, became assistant administrative dietitian, Watts Hospital, Durham, North Carolina.

Genevieve Anthony has resigned her position at St. Mary's Hospital, St. Louis, to become head dietitian of one of the units at Cook County Hospital, Chicago.

Buela K. Archer on August 15 became supervisor of the Port Angeles, Washington, school lunch room system.

L. Floy Bader recently accepted a position as dietitian in the dining hall at the Fort Lewis Branch of Colorado A. & M. College, Hesperus, Colorado.

Betty Jane Baker is a new member of the dietary staff of Grant Hospital, Chicago. She is serving as assistant administrative dietitian.

Melva Bakkie, formerly nutrition consultant, American Red Cross, Washington, is now a member of the staff of the Department of Home Economics, Carnegie Institute of Technology, Pittsburgh.

Marjorie Blackwood, who recently completed her training as a dietetic intern at Eastman Kodak Company, Rochester, New York, has accepted a position as assistant administrative dietitian of the residence halls, Yale University, New Haven, Connecticut.

Anne Butera has moved from Wilmington, Delaware, to Passaic, New Jersey, where she is working at St. Mary's Hospital.

Margaret Herder Cavanagh, following completion of her work as a dietetic intern at St. Luke's Hospital, Cleveland, became dietitian at University Hospital, Iowa City, Iowa.

Mary Collins is now director of the Student Corner and instructor at Southwestern Louisiana Institute, Lafayette, Louisiana. She was formerly at the New York State Agriculture and Technical Institute, Canton, New York.

Ruth E. Duncan recently accepted a position with Harbor Hospital, Torrance, California.

Louise Eich is now director of the cafeteria, St. Thomas College, St. Paul, Minnesota.

Pauline Epstein has been transferred from the Veterans Administration Hospital, Newington, Connecticut, to Birmingham Veterans Hospital, Van Nuys, California.

Mary Pullen Fluallen recently left this country for Manila, Phillipine Islands, where she will be the dietitian in charge of master menus for the War Department Civilian Personnel Division.

Evelyn M. Gibson is now with the Veterans Administration Hospital, Lake City, Florida. She was formerly at the Veterans Hospital, Thomasville, Georgia.

Mary O. Goff on September 21 became a member of the Department of Home Economics of the University of

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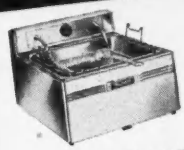

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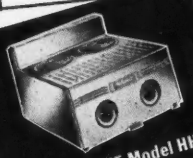
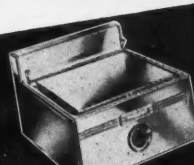
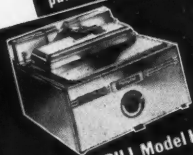
Preheats to 350° in just 8 minutes! Production capacity up 72%. Cuts fat consumption 25-50%. Exclusive lift-out fat compartment simplifies cleaning.



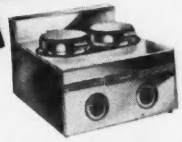
2. HOTPLATE Model HH1
Hi-Speed Calrod* units assure top-speed cooking. "Measured heat" gives rock-bottom economy. Ribbed landing deck for convenient handling of pots and pans. Rated wattage: 2.5 kw.



3. GRIDDLE Model HG2
Preheats to 400° in only 6 minutes! Exclusive depth-styling provides 212 sq. in. of usable frying area with over-all width of less than 18 in. Rated wattage: 3 kw.



4. GRIDDLE-GRILL Model HG3
Combines tremendous speed of grill with large frying area of griddle. Separate variable temperature controls for top and bottom grids. Produces an average of 1 order of bacon and eggs a minute. Rated wattage: 4.5 kw.



5. WAFFLE BAKER Model HY1
Exclusive BATTER-BRAIN makes waffle baking almost completely automatic. Patented SHAKE-OUT handle eliminates excessive sticking. Rated wattage: 1.65 kw.

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Illinois, Urbana. She recently completed work on her master's degree at Kansas State College, Manhattan.

Joyce E. Gooderum recently accepted a position as therapeutic dietitian at Wayne County General Hospital, Eloise, Michigan. She was previously at Harper Hospital, Detroit.

Elizabeth Goodman recently became director of lunchrooms for the Board of Education, Minneapolis.

Maxine Green is now on the dietary staff of Lying-In Hospital of the University of Chicago Clinics.

Thelma Harman resigned from the Veterans Administration Hospital, Bay Pines, Florida, to become chief dietitian at Nathan Littauer Hospital, Gloversville, New York.

Ruth Hayes on July 17 became therapeutic dietitian at Deaconess Hospital, Freeport, Illinois.

Ruth Henderson has left Seattle, where she has been assistant manager of the University of Washington Commons, to take up duties as dietitian for the University of California Students' Co-operative Association, Berkeley.

Shirley Hildenbrand is a new member of the dietary department of Salem Hospital, Salem, Massachusetts.

Aileen Holz has left Presbyterian Hospital, New York City, and on July 1 joined the staff of Pennsylvania State College, State College, Pennsylvania. She will be dietitian for the Commons in Atherton Hall.

Elsie Hooker is now assistant dietitian, Mercy Hospital, Denver. She was formerly on the dietary staff of the Missouri Baptist Hospital, St. Louis.

Naomi C. Howard now has a position in the Dining Hall at Florida State University, Tallahassee.

Helen G. Jacobs has been appointed first administrative dietitian, Georgetown Medical Center, Georgetown University Hospital, Washington, D. C. She was formerly chief dietitian at Garfield Memorial Hospital, Washington.

Helen Belle James is now therapeutic dietitian at St. Mary's Hospital, Rochester, Minnesota.

Harriet Kato has accepted a new position as administrative dietitian at Kaukini Hospital, Honolulu, Hawaii. She was previously at the Hospital of the University of Pennsylvania, Philadelphia.

Mary Kozeff became assistant administrative dietitian at the Hospital for Special Surgery, New York City, on August 9. She was previously with the Veterans Administration Hospital, Oteen, North Carolina.

Mary Estelle Kribs has a new position with Orillia Soldiers' Memorial Hospital, Orillia, Ontario, Canada.

P. Eileen Kunc began work on July 28 for Western Electric Company, Chicago. She will serve as food supervisor for the industrial cafeteria.

Elizabeth Kurvers has accepted a position with the Mercy Clinic in Chicago.

Ann Helen Laica has left the Wayne County General Hospital, Eloise, Michigan, to accept a position with Deaconess Hospital, Detroit.

Mary E. Leonhardy is now employed by the Billings Deaconess Hospital, Billings, Montana.

Joan Marie Livesay is now employed as assistant dietitian for the Kodak Park Works, Eastman Kodak Company, Rochester, New York. She recently completed her dietetic internship there.

Vivian Lippert has joined the division of dietetics at Miami Valley Hospital, Dayton, Ohio.

Rosemary L. Lodde is now educational consultant, Educational Section, Dietetic Division of the Veterans Administration. She is located in Washington, D. C.

Eloise Lucius, formerly with the Rubel Baking Company, Cincinnati, has opened her own antique shop, called the Tavern Antique Shop, in that city. She has a partner, Mae Paine. Miss Lucius is especially interested in antique cooking utensils.

Ruth E. McCoy on August 8 became assistant therapeutic dietitian, San Jose Hospital, San Jose, California. She was formerly at Fairmont Hospital in the same city.

Mary Alice MacMillan on July 1 took up her duties as tea room manager at Mills College, Oakland, California.

Nydia Powers Malone has left St. Joseph's Hospital, Tacoma, Washington, and is now on the staff of Tacoma General Hospital.

Aileen Merwin has resigned from Michael Reese Hospital, Chicago, and recently became nutritionist for the Chicago Maternity Center.

Frieda L. Meyer is now with the Bureau of Human Nutrition and Home Economics of the Department of Agriculture, Washington. She was previously a member of the staff of the Department of Biochemistry, Women's Medical College of Pennsylvania, Philadelphia.

Ellen K. Moore is now doing research work for the Children's Fund of Michigan, Detroit.

Margaret Moore has been transferred from the Veterans Administration Hospital, McKinney, Texas, to the Veterans Hospital, Oakland, California.

Angela E. Murphy has accepted a new position as therapeutic dietitian at Methodist Hospital of Central Illinois, Peoria. She was previously on the dietary staff of Veterans Hospital, Hines, Illinois.

Louise Neiman recently began work as assistant dietitian at the Milton Hall Cafeteria, State College, New Mexico.

Jean Irwin Olsen is now dietitian at Pepperdine College, Los Angeles.

Jeanette Owens recently became dietitian at Westlake School for Girls, Los Angeles.

Nelda R. Pearson in July joined the staff of the Medical Branch, University of Texas, Galveston.

Ophelia S. Poole on July 15 became assistant dietitian at Charity Hospital, New Orleans.

Rosemary K. Rajkowski is now with Corwin Hospital and Clinic, Pueblo, Colorado. She was formerly on the staff of the U. S. Marine Hospital, Chicago.

Martha B. Reiniger resigned as staff dietitian at Veterans Hospital, Minneapolis, to take charge of the dietary department, Rice Memorial Hospital, Willmar, Minnesota.

Mildred M. Reynolds is a new member of the faculty of Drexel Institute of Technology, Philadelphia.

Virginia Ritter is now employed at Western Electric Company, Chicago.

Eula Robins has accepted a new position in San Bernardino, California, where she will be in charge of vocational foods for the high school cafeterias.

Livia Leanora Rucci became assistant dietitian, Western Pennsylvania Hospital, Pittsburgh, on July 22.

Sarah Emily Rudolph has been transferred from Veterans Administration Hospital, Thomasville, Georgia, to the Veterans Administration Hospital, Chamblee, Georgia.

Bernice Schaad is now teaching dietitian at Tacoma General Hospital, Tacoma, Washington. She was previously employed at St. Joseph's Hospital in the same city.

Elizabeth Shamburger has been shifted from the Veterans Administration Hospital, Thomasville, Georgia, to Kennedy Veterans Administration Hospital, Memphis, Tennessee.

Mary Batson Simon has left Orange County Hospital, Orange, California, to accept a position with Fairmont Hospital, San Leandro, California.

Sister Georgene has been transferred from St. Vincent's Hospital, Green Bay, Wisconsin, to St. Nicholas Hospital, Sheboygan, Wisconsin.

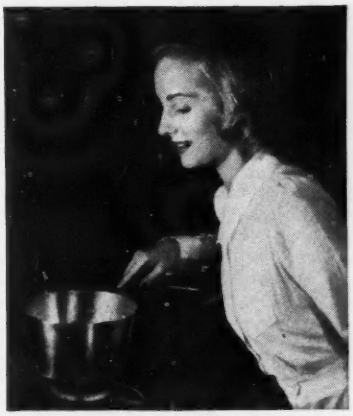
Sister Mary William Hipp has left St. Rose Hospital, Great Bend, Kansas, and is now at St. Catherine Hospital, Garden City, Kansas.

Katherine Randall Staley has been appointed assistant therapeutic dietitian at Good Samaritan Hospital, Cincinnati.

Wilma A. Swallow has been transferred from the Veterans

DRAMATIC DEMONSTRATION of how

Pour a pint of milk into a Wear-Ever saucepan.



Place saucepan over low heat and let milk boil.

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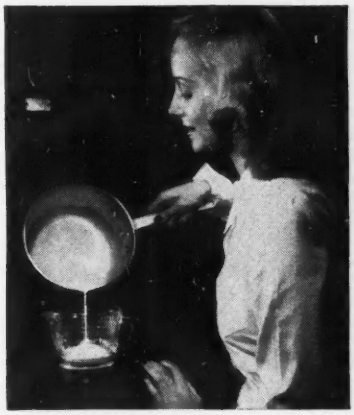
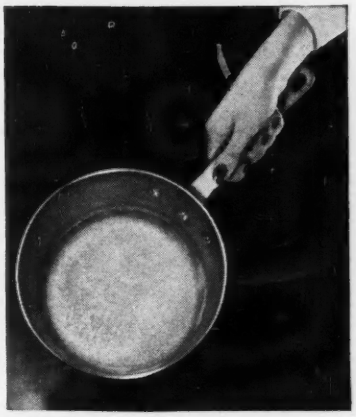


Without stirring, the pint will boil down to ¼ pint.



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Administration Hospital, Topeka, Kansas, to the Veterans Hospital, Hot Springs, South Dakota.

Helen Tipton recently became nutritionist for the Borden Company, Chicago.

Eleanor Turner is a new dietitian at the University of Illinois, Chicago.

Myra Alice Werner has accepted a new position at Mills Memorial Hospital, San Mateo, California.

Cherydal Werts is now employed at the Warrensville Sanatorium, Warrensville, Ohio.

Edna Windenburg was recently transferred from the U. S. Marine Hospital, Boston, to the U. S. Marine Hospital, Chicago.

Annette Zelzer is a new member of the dietary staff at the University of Chicago Clinics, Chicago.

Announcements of the following marriages have been received in the JOURNAL office:

Betty Jane Adney is now Mrs. Clifford C. Gaynard and is living in Floyd, Virginia. She was recently separated from service.

Dellora Allen on August 17 became the bride of A. Cohen. The couple will make their home in Oklahoma City.

Evelyn Dershimer was married on August 26 to Frederick Stallworth Hybart in Scranton, Pennsylvania. The couple will make their home in Mobile, Alabama.

Helen Louis Dietz, following her recent marriage to William R. deHollander, is now making her home in Seattle. She was formerly dietitian at Tacoma General Hospital, Tacoma, Washington.

Mary Virginia Dodds was married to John I. Phillips in the summer and has moved from Crystal Lake, Illinois, to Pittsburgh.

Audrey Virginia Erdsiek recently became the bride of Lawrence Gundry. The couple will make their home in Columbia, Missouri.

Martha Gallaher's new name is Mrs. L. J. Hardy. The Hardys are living in Washington, D. C.

Rebecca Harris was married on June 28 to Donald J. Adams.

Letha Henderson recently resigned her position with the Thomas Dee Hospital, Ogden, Utah, to become Mrs. R. C. Glasmann, Jr., and is now at home in Ault, Colorado.

Ione Larson is now Mrs. Lyle Dabel and continues to live in Sanford, North Carolina.

Doris Koskinen became Mrs. T. C. Burr, Jr., on September 7. Before her marriage she was employed at the Theda Clark Hospital, Neenah, Wisconsin, but will now live in Indianapolis.

Naomi Lockard (**née Thacker**) will continue her work as staff dietitian, Veterans Administration Center, Martinsburg, West Virginia.

Marjorie MacKenzie (**née Prince**) has accepted a new position on the dietary staff of the University of Virginia Hospital, Charlottesville, Virginia.

Marjorie J. Macy was married in February to Dr. James Hale Rutledge and is living in Pontiac, Michigan. She recently accepted an appointment as assistant dietitian at the Pontiac State Hospital.

Bobbie Jean May is now Mrs. Robert C. Ball and is living in New Orleans.

Wilhelmina Murphy on June 28 became Mrs. W. M. Fosdick. She is continuing her work as dietitian in the Consumer Service Department of Armour and Company, Chicago.

Margaret J. Nilson is now married to Richard C. Mott. The Motts are living in Danville, Illinois, where Mrs. Mott is employed at the Veterans Administration.

Phyllis Plaster recently became Mrs. Keith D. Carlson and is at home in Moscow, Idaho. She was formerly employed at Emanuel Hospital, Portland, Oregon.

Phyllis Rowe was married last November to Captain Gerald C. Randall. She was recently separated from the Army and is now on the staff at Salem Hospital, Salem, Massachusetts.

Ethel Eunice Smith recently became the bride of R. L. Rasmussen. Mrs. Rasmussen is dietitian at Latter Day Saints Hospital, Idaho Falls, Idaho.

Jeannette Marie Stanger recently became Mrs. William E. Thompson. The Thompsons are at home in Johnson City, Tennessee.

Elizabeth Mae Stieg has resigned her position as staff dietitian at Veterans Administration Hospital Annex, Vancouver, Washington, to become the bride of Dr. James F. Tagge, and has moved to St. Louis.

Elizabeth D. Taylor was married on March 11 to Thomas S. Jensen and is now living in Royal Oak, Michigan. She was formerly employed at Women's Hospital, Detroit.

New Appointments, Veterans Adminstration

The following hospital appointments of dietitians (not previously announced) have been made by the Veterans Administration.

Name	Position	Location
	Branch No. 2	
Louise C. Zambrano	Head Dietitian	Bath, N. Y.
	Branch No. 3	
Helen Miller	Staff Dietitian	Coatesville, Pa
	Branch No. 4	
Ruth Smith	Staff Dietitian	Richmond, Va.
	Branch No. 10	
Lois F. Abat	Staff Dietitian	Alexandria, La.
Allie L. Aycock	Staff Dietitian	Alexandria, La.
	Branch No. 13	
June Lorin Swan	Staff Dietitian	Salt Lake City, Utah